April 28, 1962
Vol. 162 — No. 17

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Phone-Tone colors in spring fashions and matching color telephones are featured in the display window of Milady's women's shop at Muskegon, Mich. General Telephone Co. of Michigan provided the telephone tie-in for the store. The Phone-Tone promotion is being staged across the country this year by telephone companies and local stores.

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MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

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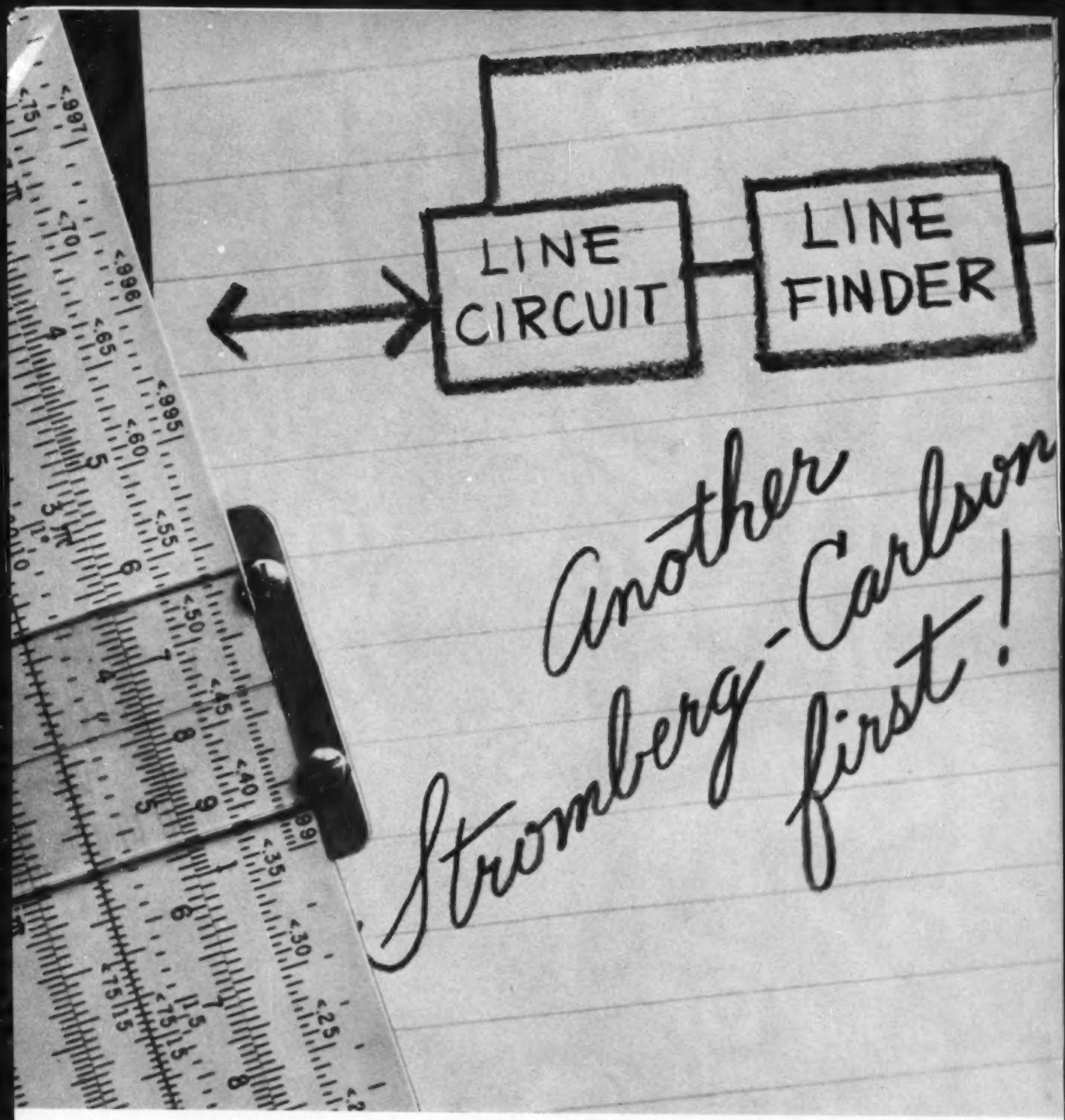

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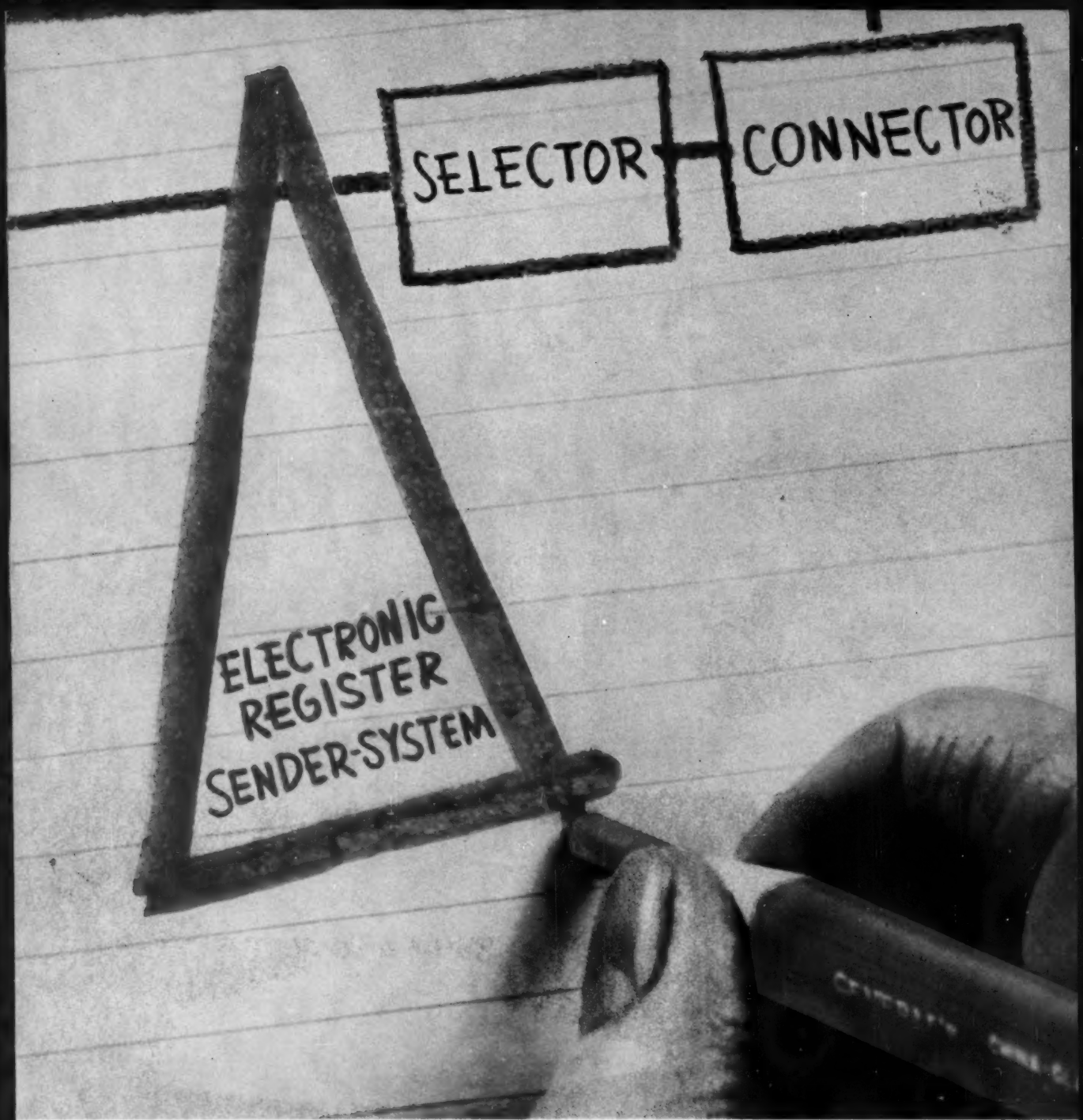

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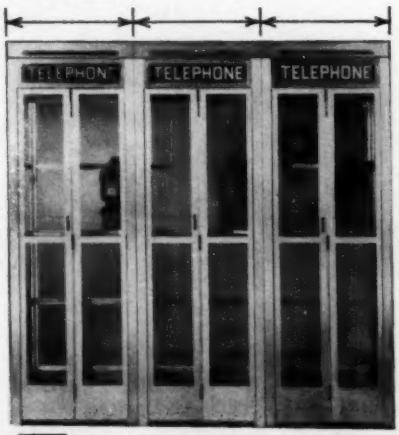

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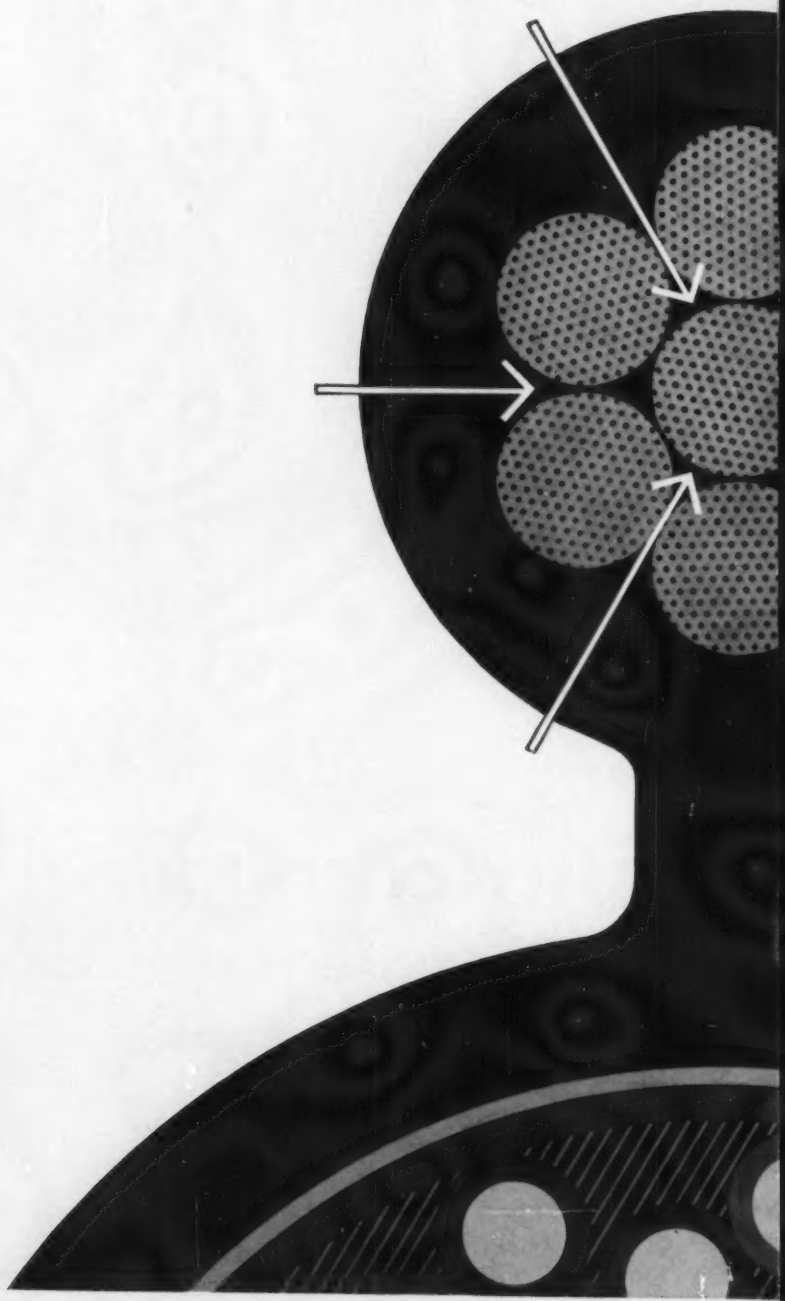

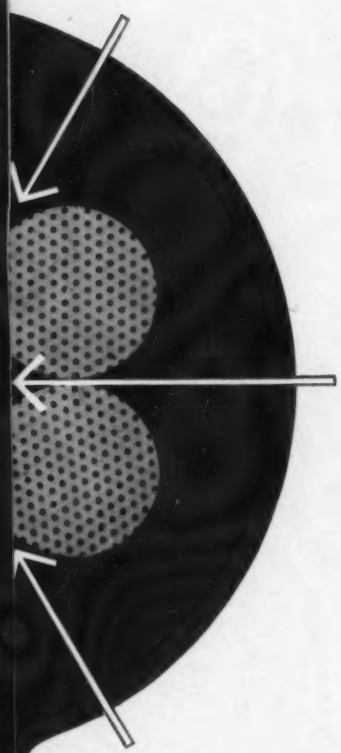

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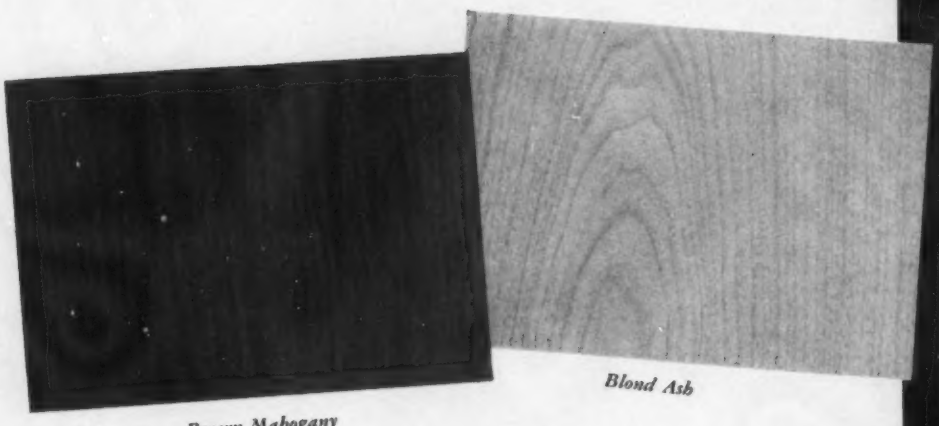

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FLASHES AND PLUGS

A LITTLE "JOLLY" NOW AND THEN. From the archives of the Chesapeake & Potomac Telephone Co. of Virginia an 1880 poster listing "Rules for Troublemen" is noted. The poster, which is being exhibited in the Norfolk, Va., Museum, tells outside trouble men how to stay out of trouble.

Here, reprinted from the Norfolk "Virginian Pilot", are the 13 points James D. Tracy, general manager of the Norfolk Telephonic Exchange, offered on Apr. 6, 1880:

(1) Put up a "good front." It is not necessary to advertise any tailor shop, neither is it necessary to go about your work looking like a coal heaver. Overalls can look as respectable as anything else, but they must at least show that they are on speaking terms with the laundryman; and shoes must have a bowing acquaintance with the bootblack.

(2) Make the liveryman wash and oil your wagon and harness, and do not tie the harness up with wire longer than is necessary to get proper repairs. The same may be said of your suspenders and buttons.

(3) Keep all unnecessary junk out of your wagon.

(4) Go about your business cheerfully and quietly. When you enter a residence don't overlook the footmat.

(5) Close the door when you go out, not forgetting to shut the front gate.

(6) If you ever believe that a subscriber is a crank, forget it. All of them are wise enough to tell when a telephone is not working right. Not every troubleman can do this.

(7) Be courteous and polite, and don't be afraid to hand out a little jolly occasionally. It doesn't hurt anybody's feelings to be jollied a little.

(8) Treat everybody as you like to be treated, not forgetting your horse; if you want to know the horse's side of it, just take off your coat and hat some zero day, hitch yourself to the same post with your belt, and stand there about two hours. Hereafter don't forget his blanket.

(9) Don't idle away your time; there is always something to do if you will only do it.

(10) Carry yourself with dignity and others will accord it to you.

(11) Study your business and try to improve the quality of your work.

(12) Report for duty promptly and don't be afraid of working overtime.

(13) If you don't like your job, resign. It will be better for you and the company.

•

INSTRUMENT OF INDIGNATION. About the turn of the 20th Century, the telephone made a dramatic and brief entry into Persia. A new Shah, in an outburst of love for his subjects, installed a telephone line between his palace and the market-place in Teheran.

This telephone allowed the people to speak to the Shah whenever they had a complaint about the government. The telephone hummed as the people talked. And how they talked! It even made the Shah blush.

He ordered out his soldiers to attack the people. Following this, he attacked the new parliament and was in turn chased out of Persia. Reported by "Blue Bell", Bell Telephone Co. of Canada.

•

THE LETTER OF THE LEASE. A man telephoned his local pet shop. "Send me 30,000 cockroaches at once," he ordered.

"What in the world do you want with 30,000 cockroaches" asked the pet shop owner.

"Well," said the man, "I'm moving today, and my lease says I must leave the premises in exactly the same condition as I found them."—from "Feedstuffs" magazine.

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

SINCE 1901

April 28, 1962

CONTENTS

IN THE NATION'S CAPITAL 17
By Lawrence J. Hogan

ABOUT SPACE COMMUNICATIONS, PART 5 19
By Ralph O. Beck

TELEPHONY'S ELECTRONICS SECTION 21
By Paul E. Murphy

THE PLANT MAN'S NOTEBOOK 26
By Ray Blain

PLANT MAN'S QUIZ 28
By Ray Blain

ANOTHER LOOK AT JOINT-USE CONTRACTS ... 32
By Martin J. Luichinger

TRAFFIC LOAD MEASUREMENTS OF PBX AND PABX TRUNKS TO C.O. 38
By E. W. Slater

CENTRAL OFFICE PROTECTION, SEC. 2 46
By L. N. Martin

COURTS AND COMMISSIONS 54

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VAC **Circulation Audited and Verified (direct from auditor to subscriber) By Verified Audit Circulation Co.**

Published every week on Saturday by TELEPHONY PUBLISHING CORP., 608 S. Dearborn St., Chicago 5, Ill. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879. 30c per copy (except special issues—50c). Subscription $4.50, 1-year; $7.00, 2-years; $9.00, 3-years. Add $1.00 per year for postage to Canada and Pan American countries; $2.00 per year to Foreign countries. Telephone: 922-2435 (DDD Area Code 312).

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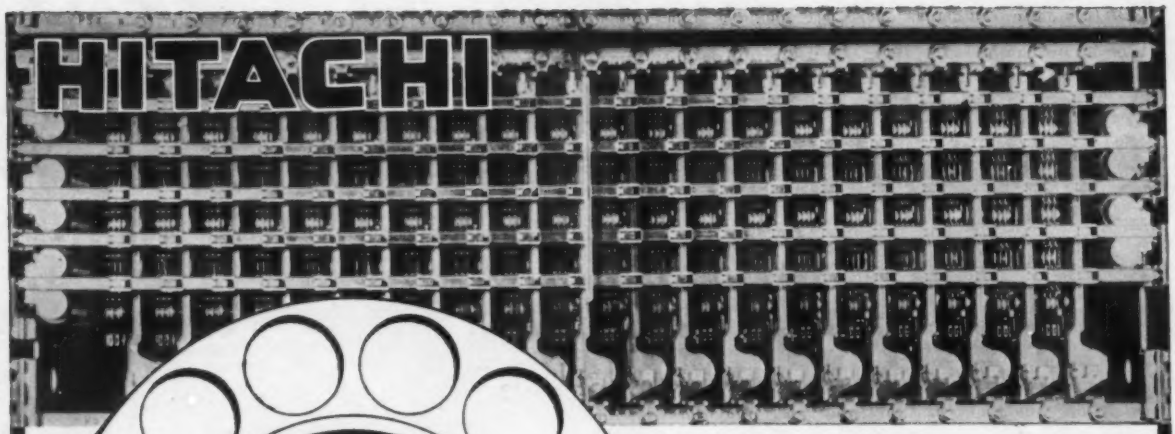

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Polyethylene insulated-jacketed cable shrugs off punishment!

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IN THE NATION'S CAPITAL

BY LAWRENCE J. HOGAN, WASHINGTON EDITOR
and President, Larry Hogan Associates,
Public Relations Firm.

CWA's Beirne backs free enterprise at Senate Committee's hearing on satellite communications. Corporate and dividend tax on co-ops urged. President's committee recommends changes in administrative procedures of federal regulatory agencies.

THE testimony of Joseph A. Beirne, president of the Communications Workers of America, AFL-CIO, on Apr. 13, before the Senate Commerce Committee on the satellite communications bill is interesting in several respects. Mr. Beirne apparently recognizes a fact which is too often overlooked by his colleagues in the labor field: That our free enterprise system benefits the working man as well as the businessman.

Mr. Beirne told the senators that a short while ago the CWA sponsored two independently conducted studies of privately-owned and publicly-owned communications companies relating to rates charged, wages paid, existing conditions of employment, and service which the public received. Beirne said the professors who conducted these studies found that the privately-owned, managed and operated companies render better service to the public, provide superior wages and working conditions and charge no greater rates than the publicly-owned companies.

"An appreciation of existing communications systems, and of the continuing research and development programs of the communications carriers," Beirne said, "leaves no valid basis to doubt or question the capabilities of private enterprise in the field of space communications. After all, a communications satellite system is really nothing more than an extension and improvement of existing communications systems—basically different only in that it consists of microwave towers in the sky." He continued:

"While it is generally recognized that there is no justification or necessity to deviate from the historical and traditional communications policy of the United States—that government regulated, privately-owned common carriers provide these supplemental facilities for international communications service—there does appear to be some support for government ownership of a communications satellite system.

"There appears to be some concern that somehow or other our foreign policy gets involved in this matter. I would simply make the observation that there has never been a single instance, to my knowledge, where the activities of the private communications companies have ever caused embarrassment to the United States or its foreign policy.

"There seems to be some concern that the taxpayers must be protected through government ownership and control because they have invested a great deal of money in the building of rockets for the government. I am confident that the private companies have not the slightest idea of capitalizing on this situation to the detriment of the public interest. They are perfectly willing to pay the cost of rocketry required to boost communications satellites into orbit. It should be noted, too, that the money and ingenuity that have gone into the building of the communications satellites have all been provided by the privately-owned carriers. A privately-owned communications satellite system would be a by-product of the taxpayers' investment in rocketry and would be good for this country.

"We should not be ashamed of our private enterprise system. It is my belief that it is a selling point that is not used enough by Americans who travel around the world. There is no communications system in the entire free world that compares with ours in both service to the public and cost to the public.

"When we have before us something that has worked, such as the private companies in the communications industry have worked for over a hundred years, I think it is late in the day to start tampering philosophically—or any other way—with that kind of a system, which has been profitable to the public. . . .

"We firmly believe, as we have previously testified on this matter, that the public interest would best be served, and that the policy and purposes declared in S. 2814 would best be met, if ownership of a communications satellite corporation would be limited to the regulated common carriers which are directly responsible to the public for rendering service."

We hope Mr. Beirne will spread the word about his organization's findings to his confreres in the AFL-CIO.

Satellite Bill Approved

The House Commerce Committee approved a communications satellite bill on Apr. 11 which directs the FCC to "encourage" communications companies to build and operate the ground stations for the satellite system. There were no votes in the committee against the bill, but several members expressed reservations about anti-trust aspects of the measure and the provisions regarding ownership of the ground stations.

The ground station provision closely follows the language of the bill approved by the Senate Space Committee. Rep. John E. Moss (D., Cal.), a committee member and one of the few legislators who had not left for the Easter recess, said he would oppose the provision because it gives preferential treatment "not based on the public interest."

Under both the House and Senate committee bills a private corporation

would own and operate the communications satellite system. Communications companies could buy up to 50 per cent of the stock in the corporation, with the other 50 per cent reserved for the general public at $100 per share. The corporation's board of directors would consist of 15 men, three appointed by the President subject to Senate confirmation, six elected by the communications companies owning stock, and the other 6 would represent the public stockholders. The House bill would reduce the number of corporation board members if 50 per cent of the stock is not purchased.

Tax on Co-ops Urged

William L. Clayton, former Under-Secretary of State during the Truman administration, endorsed the imposition of a 20 per cent withholding tax on cooperative dividends as included in President Kennedy's tax reform bill. The provisions of the House-approved bill, however, exempt cooperatives which are REA borrowers.

Clayton told the Senate Finance Committee that farm co-ops have enjoyed a tax advantage over normal corporations for years. He urged passage of a withholding tax on patronage dividends which co-ops give to farmer members. He also said that Congress should require co-ops to pay the same 52 per cent corporate tax as other businesses. Clayton said "many millions of dollars are escaping taxation."

S. J. Lanahan, representing the Progressive Tax Committee, approved Clayton's views. He said the pending bill leaves doubt whether "scrip" dividends, redeemable in cash or goods, can be included as taxable income to a farmer and subject to withholding tax. He suggested that the legislation be revised to make it clear such dividends are either income or taxable as earnings to the co-op if retained for reinvestment.

Garner M. Lester, president of the National Tax Equality Association, in testimony before the committee, said that cooperatives have become "big business" and have thrived on tax favoritism far too long. Lester urged legislation which would require co-ops to pay the same 52 per cent corporate income tax that other businesses pay.

He gave the example of a Kansas City farm co-op which started with $30,000 in capital in 1929, and now has a net worth of 59 million dollars, with investments in pipelines, feed mills, a paint factory, and 10 warehouses. Hearings on the tax bill are scheduled to run through May 3.

Have You Looked at Yourself - - - Lately?

Has it occurred to you that now you may be eligible to join the Elite Corps of the Independent Telephone Industry? Don't you think that you are entitled, after all these years of patient building, to a capstone on your career? If so, don't cheat yourself out of the prestige of a very valuable association as well as a rewarding personal experience.

In simpler words, perhaps you are eligible for membership in the Independent Telephone Pioneer Association. Active members of this association are required to be men and women of good standing, presently or previously employed in the Independent Telephone Industry, or its associated interests, who have had not less than 15 years of service in the Industry. They must also be, at the time of application, employed in the Independent Telephone Industry, its associated interests, the communications branch of the Armed Forces, or as private branch exchange operators, or have been retired. The dues of active members are only $3.00 a year.

Associate memberships are open to Independent Operating, Manufacturing, or Supply Companies. The dues for Associated Members are $5.00 yearly minimum. Many of the larger companies are paying $25.00 and $50.00 per annum in support of this inspiring organization.

All prospective members should communicate with Sophia K. Davis, Executive Secretary, Independent Telephone Pioneer Association, Room 406, Ferguson Building, Springfield, Illinois.

Bell's Views on Tax Bill

At the recent stockholders meeting of AT&T, Board Chairman Frederick R. Kappel explained the company's position on the tax revision bill presently pending in Congress. He said that the proposed tax credit to business "is not a step toward the basic reform we believe is required." He said it could be a windfall for many companies which are planning new facilities, but it would not help other companies which might have the most need to modernize, but do not have any taxable income to take a credit on.

Kappel proposed that Congress should revise the tax laws to improve depreciation allowances. He said this country is behind in modernization and expansion of production facilities because many businesses have not been able to replenish the capital "eroded through high tax rates and inflation." Because of this, he said, many companies have not been able to update their plants and equipment.

Regulatory Reforms Urged

The Administrative Conference of the United States, created last year by the President to make recommendations for improving administrative procedures in federal regulatory agencies, has advanced five proposals.

The group recommended (1) that hearing examiners be allowed to make final decisions without agency review under certain circumstances; (2) agency heads be asked to eliminate "gobbledygook" in agency documents prepared for publication; (3) that wider

(Continued on page 84)

ABOUT SPACE COMMUNICATIONS

By RALPH O. BECK*

PART V

HEARINGS on proposed space satellite communication legislation have now been conducted by four congressional committees. At the time of this writing, two Senate committees are simultaneously holding hearings. The Committee on Commerce, Sub-committee on Communications, chaired by Sen. John O. Pastore (D., R.I.), has been busy hearing both government and communication industry witnesses. Sen. Estes Kefauver (D., Tenn.) chairs the Subcommittee on Antitrust and Monopoly of the Senate Committee on Judiciary, which also has been hearing witnesses.

Last week's article quoted at some length a few of the witnesses that appeared before Senator Kefauver's committee. This week's article concludes the series on space communications in TELEPHONY by outlining the highlights of the current hearings in the Senate Communications Subcommittee. These are significant hearings because several of the witnesses appearing before Senator Pastore's sub-committee are relating a different story about proposed legislation from that heard before the Anti-trust and Monopoly Sub-committee.

Review of S.2814

They are also significant because most of the witnesses are concentrating their attention on S. 2814 as reported out of the Senate Aeronautical and Space Sciences Committee by Sen. Robert Kerr (D., Okla.). The amended bill continues to feature private ownership of the proposed satellite corporation, and not an agency or establishment of the U. S. government. The common stock of the corporation is to be divided, as being available, 50 per cent to the public and the remainder to FCC authorized communications carriers.

Other highlights of the bill provide that the corporation have a 15-member board of directors (six elected by the public, six by the carriers, and three appointed by the President of the United States); that carrier investments in common stock of the satellite corporation would not be allowed in their rate base; however, investments in other issued securities such as bonds, debentures and preferred stock would be allowed for international communications only; that the State Department shall be advised when the corporation is about to negotiate with foreign entities and would assist if requested by the corporation; that ownership of the ground stations would be determined by the FCC, which would be authorized to license either the corporation or the communication common carriers to establish and maintain, either jointly or separately, the ground terminals.

Pastore Establishes Setting

Senator Pastore established the setting very early in the hearing when he said,

". . . this is an over-all, very panoramic investigation and exhaustive study of satellite communications and there are no limitations, and the members of this committee are at liberty to develop what we would hope to be the best kind of legislation and the best solution in the public's interest.

"When the Communications Act of 1934 was enacted, the Congress was explicit in stating that the Federal Communications Commission was being created to regulate interstate and foreign commerce in communication by wire and radio to make available so far as possible to all the people of the United States a rapid, efficient, nationwide and worldwide wire and radio communication service with adequate facilities at reasonable charges.

"Within this policy framework we have seen the development of a dynamic communication system that has given the United States unquestioned leadership in the communications field. Every effort should be made to assure the continuance of this advance.

"I am hopeful that the various agency representatives who will appear at these hearings will spell out as specifically as they can their respective responsibilities under this legislation so that a clear legislative history can be developed. Every witness desirous of having his views considered will be given an opportunity to be heard or to file a statement with the committee."

NASC For Private Ownership

The first of the government witnesses to testify on the amended version of the administration bill was Dr. E. C. Welsh, executive secretary of the National Aeronautics and Space Council. Dr. Welsh set the pace when he pointed out that the following points "merit particular attention":

"(1) The new corporation would be *wholly owned by private investors*, would be operated for profit, and would have the anticipated benefits in efficiency which so often characterize private ownership and private initiative, including competitive procurement of equipment and services.

"(2) The chances of *domination or control of this national asset* on the part of any individual, company, or private concentration of economic power are minimized

*This is the final in this series of articles by Mr. Beck, who is Vice President of Hawaiian Telephone Co. of Honolulu. He represented his company on the FCC **Ad Hoc** Carrier Committee composed of 10 U.S. international common carriers, to study establishment of satellite communications system.

through the limitations placed on the amount of voting stock and directors subject to such control, and by the broad-based ownership provision which greatly lessens the opportunity for financial domination.

"(3) The bill provides that both the new corporation and authorized common carriers may *establish and maintain satellite terminal or ground stations*. The FCC would have the responsibility for determining the public interest, convenience, and necessity in regard to the licensing of such stations.

"While there have been some differing views as to this feature of the proposed legislation, I believe it needs emphasis that the *new corporation should have the authority to own such facilities* so as to give assurance of the adaptability of the system to rapidly changing technical progress, so as to obtain greater versatility for accommodating different types of services, to give greater certainty as to the continuity of service during emergencies, to help avoid unnecessary duplication and thereby minimize capital investment and operating costs, to keep the system competent to meet expanding global requirements, to meet possible national security needs, and to help make FCC regulation more effective.

"(4) It has been suggested that the establishment of a private company to make operable a competence financed primarily by taxpayers' money is, in effect, *"giving something away."* I do not look at the situation that way. Under either government or private ownership, the effective employment of this new technology should *increase the gross national product* of the country and result in a broad and wide-ranged benefit. If privately owned, the government will receive *additional tax revenues*, while at the same time the *"know-how" will still be available* to the government for any system which it wishes to establish and for use in other space activities.

"(5) While the various scheduled tests of experimental satellites will be continuing, it is important that a *decision be made as promptly as possible* in regard to the form and nature of the organization which will translate proven competence into actual operations.

"(6) *Limiting the ownership* to a chosen few companies such as the international carriers, would have no national advantages and a number of significant disadvantages.

"(7) In my view, every reasonable effort will be made to get the most competent management and the most talented technicians obtainable, regardless of how wide or how narrow the ownership base may be."

Favors S. 2814

Under-Secretary of State for Political Affairs, George C. McGhee, discussed at some length the international aspects and foreign interest in communication by satellite. Mr. McGhee supported the amended version of S. 2814 as he pointed out the "widespread recognition in other countries of the prospective economic and political benefits from the successful development of communication satellite relays."

He stated that:

"The International Telecommunication Union (ITU) has given active and foresighted attention to the problem of making available the necessary allocation of radio frequencies. Allocations for experimental space communications were made in 1959, and an extraordinary administrative radio conference is tentatively scheduled for late next year to consider allocations for continuing space communications uses."

UN Shows Keen Interest

He went on to say that "keen interest in space communications was evident during the discussions of the United Nations General Assembly in December, 1961." He introduced, for the record, a UN resolution calling for cooperation in space communications and other peaceful uses of outer space.

Mr. McGhee further stated:

"Moreover, a number of countries, including the United Kingdom, France, Brazil, Italy, Germany, are well advanced in preparations to join with us in communications experiments later this year in connection with projects RELAY and TELSTAR; possibilities of participation by additional countries in these and later experiments are being actively explored."

The Under-Secretary of State concluded his testimony by saying:

"Finally, let me point out that the corporation which this bill would create will be the American participant in what will eventually be an international communications system. What form the international system will take we do not know, and indeed we cannot know. What we do know, at this time, is that many other countries are interested in participating with us in this venture, and that the sooner we establish an American corporation to lead the way, the sooner we will be able to realize the tremendous benefits of an international system."

Justice Approves Bill

Nicholas Katzenbach, newly-appointed assistant attorney general, testified for the Justice Department. His statement was interrupted and was not completed at the time this article was written. The communications sub-committee is scheduling Mr. Katzenbach to make another appearance so as to complete his testimony. He did indicate that "the changes made last week by the Space Committee in S. 2814 are generally consistent with our views."

Strongly supporting the amended administration bill, James E. Webb, Administrator for National Aeronautics and Space Administration (NASA) stated:

"Today, the United States needs to place the strongest emphasis on the necessity for getting a driving effort going within and among the communications companies with the know-how to solve the technical problems involved in bringing an operating system into being, and also on creating the greatest incentives possible to establish a commercial communications satellite system at the earliest practicable time. S. 2814 will provide the organizational framework for this effort, and, in keeping with our system of free enterprise, place it under private ownership."

Mr. Webb traced the responsibilities of NASA under the proposed measure and then significantly stated:

"The decisions made by the United States since World War II which are embodied in the Atomic Energy Acts of 1946 and 1954, in the National Science Foundation Act of 1950, in the National Aeronautics and Space Act of 1958, and in the Arms Control and Disarmament Act of 1961, comprise a pattern through which this nation is moving on, step by step, to work with other nations, using the tools and capabilities of science and technology for the benefit of all mankind. Any view of the President's proposals in S. 2814 which does not recognize them as a part of this continuing pattern has not caught the vision toward which the President reaches."

Mr. Webb concluded his statement by saying:

"The strongest impetus which can be given to the task of developing a system which is technically feasible

(Continued on page 76)

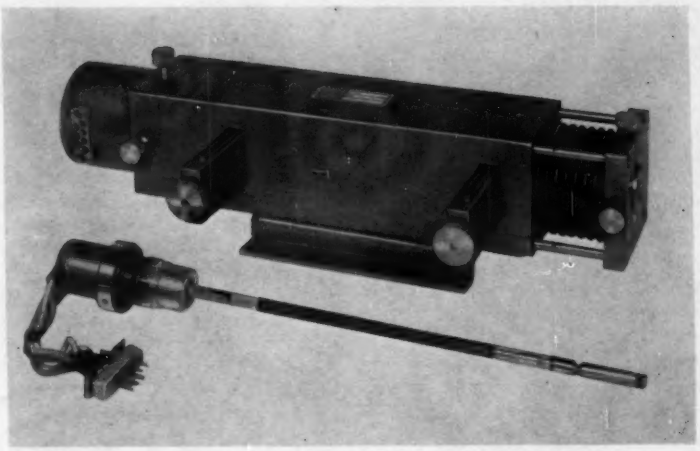
TELEPHONY'S ELECTRONICS SECTION

BY PAUL E. MURPHY, ELECTRONICS EDITOR

MICROWAVE COMPONENTS

NEW AND often improved older methods of design and manufacture result in more economy and practicability in the development of various arts. Modes of communications are no exception. Many of the new developments are in the design and manufacture of microwave components. These refinements lend themselves to greatly expanded and ever-increasing numbers of microwave networks.

Many of us who are associated with microwave techniques are familiar with the "Traveling-wave tube" as a device to increase power output of microwave transmitting equipment. Traveling-wave tubes are not inexpensive and result in increased equipment costs, therefore their use is limited in many instances.



New design and manufacturing techniques have enabled English Electric Value Co., Ltd., to produce a low cost, broad-band "Traveling Wave Tube" and periodic permanent magnet focusing mount. The device is designed to operate in the frequency range of 5.9 to 8.2 Gc/s with a saturation output of 13 watts at 5.9 Gc/s.

The 28-foot diameter parabolic reflector atop Lincoln Laboratories is reportedly the "largest precision parabolic reflector ever successfully fabricated in one piece." Power gain at a wavelength of 8.5 millimeters has been said to be in excess of 67 db's, while "an absolutely perfect ideal parabola under these conditions would be only 70 decibels."

English Electric Value Co., Ltd., recently announced the development of a new low-cost broadband traveling wave tube and periodic permanent magnet focusing mount as a result of new design and manufacturing techniques.

Distributed in the United States by Calvert Electronics, Inc., New York City, the tube and mount has been designed to operate over a frequency range of 5.9 to 8.2 Gc/s (Gigacycles per second), the lower portion of which falls in the common carrier band.

"Complete interchangeability of the tube, type N 1029, and the focusing mount, type N 4025 have been achieved", it was reported, and a simple adjustment provides for a match of VSWR (Voltage-Standing-Wave-Ratio) not exceeding 1.5:1. Natural air-cooling is used eliminating requirements for other cooling methods such as external forced air methods.

Further specifications are said to include less than one half mw. r.f. input for an output of 5 watts, thus permitting the use of solid state circuitry as a driver; noise level 28 db; output power saturation of 13 watts at 5.9 Gc/s and a gain of 43 db with an output power of 5 watts.

Also of interest in the microwave field of communications is a recent development in antenna designs.

What has been reported to be the largest precision parabolic reflector ever successfully fabricated in one piece is now atop the Lincoln Laboratory of the Massachusetts Institute of Technology.

Fabricated by Electronic Specialty Co. of Los Angeles, Cal., the 28-foot diameter parabolic reflector has been reported to have a surface so accurate that physical measure-

ment of errors in the surface is not feasible through the use of ordinary measuring apparatus. Tests of accurancy, therefore were placed on performance and beam pattern measurements accomplished at Lincoln Laboratories. Beam pattern tests at a frequency in excess of 35 Gc/s having a wave-length of 8.5 millimeters were said to have shown a beam width of only four and one-half minutes of arc at the main lobe. Tests also reportedly indicated side lobes of approximately some 25 dbs (decibels) down from that of the main lobe. The measured power gain was said to be in excess of 67 decibels, while it was pointed out that "an absolutely perfect ideal parabolic under these conditions would be only 70 decibels.

The reflector was surfaced by Electronic Specialty's new "Spin-Casting" process developed over the past two years. This process forms a natural paraboloid by centrifugally spinning liquid plastic materials in a suitable "bowl" until they are fully reacted or cured. Thereafter the surface is metallized or mirrorized to reflect the radio waves or light at wavelengths of interest. In this case the surface was molten-spray-metallized for use with radio wavelengths in the millimeter range.

A framework, reportedly consisting of aluminum tangential beam of plate girder design and which is used to support 6-inch-thick honeycomb panels and to which the surface directly adheres, is used to support the precision reflector in order that external forces would not, within normal tolerances affect the "shape."

OVER-THE-HORIZON DEVELOPMENTS

TT FEDERAL Laboratories, a division of International Telephone and Telegraph Corp., recently announced the development of a very economical radio transmitter that is one-tenth the size and weight of similar transmitting equipment. The new 1 kilowatt transmitting equipment is reportedly presently available in the 1.7 to 2.4, 2.5 to 2.7, and 4.4 to 5.0 Gc bands.

Through the use of solid-state circuitry in the frequency-multiplier circuits and low-power amplifier stages, as well as control circuitry and power supplies, the unit has been designed to provide a high degree of reliability and low current consumption. With the result of compactness and relative light weight, ease of transportability is expected to effect a wide range of communications application throughout the world. Further, toward this objective, operation is made possible from 50 or 60 cycles, single phase or three-phase power supply units.

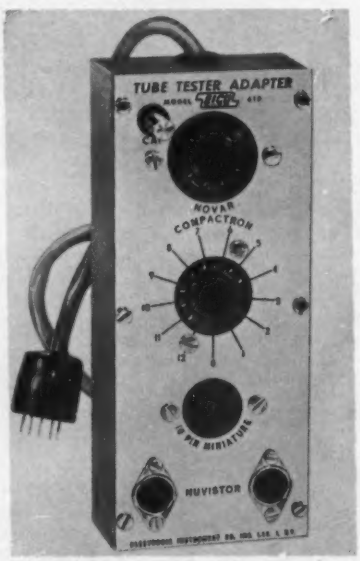
The transmitter is said to be comprised of three major sub-assemblies: A wideband demodulator having low distortion; a one-half-watt radio frequency crystal controlled generator, multiplier and driver; a one-kilowatt amplifier, the only vacuum tube within the transmitting unit.

The amplifier was described as weighing approximately 370 pounds, as being 40 inches in height, 17 inches wide and 24 inches deep; while the modulator and radio frequency generator sub-assemblies are each 8¾ inches in height, 17 inches wide, and 24 inches deep, and together weigh less than 75 pounds.

The new transmitter is expected to find a wide range of applications in active-satellite and over-the-horizon communications systems as well as facilitating path surveys for proposed over-the-horizon links.

TEST EQUIPMENT

ELECTRONIC Instrument Co., Inc. has announced the development of an Adaptor, Model 610, to permit the Model 625 emission type tube testers and Model 666 dynamic conductance tybe tester to be used in the testing of new construction type tubes.



EICO Model 610 tube tester.

The new adaptor plugs into a nine-pin socket of the tube tester, and with the use of a 10th connection provided by a cap terminal on the adaptor for connecting a grid cap lead from the tube tester, new tubes such as the five-pin nuvistor, seven-pin nuvistor, novar, 10-pin

miniature, and 12-pin compactron, may be tested.

Included with the No. 610 adaptor are roll-chart supplements, both the Model 625 and Model 666 tube testers covering the tubes listed.

STANDARDS LAB CONFERENCE

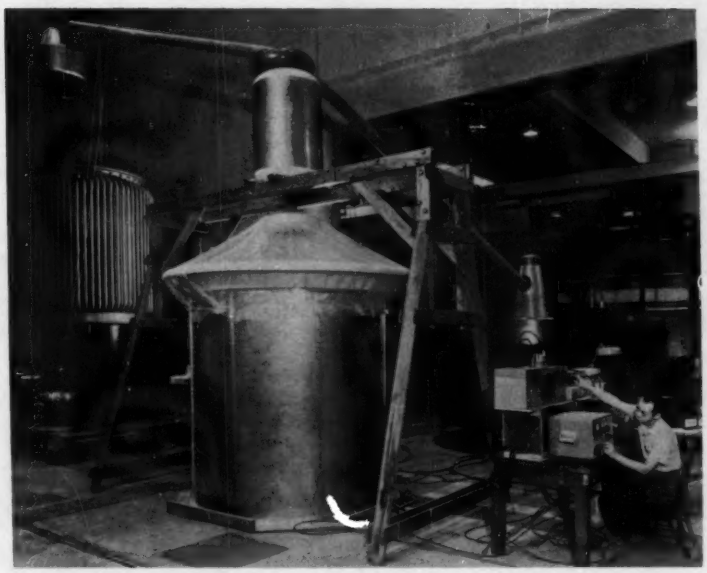
THE 1962 Standards Laboratory Conference will be held Aug. 8-10 at the Boulder Laboratories of the National Bureau of Standards, U. S. Department of Commerce, Boulder, Col. Allen V. Astin, NBS Director will be general chairman of the conference.

The conference will be used primarily as a medium for disseminating information on organization and practices of Standards Laboratories. It will serve to complement the 1962 International Conference on Precision Electromagnetic Measurements, also to be held at the Boulder Laboratories on Aug. 14-16.

"THE MIGHTY PIKE"

A NEW DEVICE, to become known as "the biggest little capacitor in the world" by National Bureau of Standards scientists, has been developed as a major first step in a program for the calibration of high-voltages. The one-picofarad (often prefixed "micromicro") 350,000-volt capacitor will primarily be used for determining voltage ratio and phase angle corrections of instrument voltage transformers.

The development is the result of a request by the Ontario (Canada) Hydroelectric Power Commission for use in calibrating its 350,000-volt instrument transformers. It has been indicated the new device will also be used "for calibration of other instrument transformers of up to 350,000 volts for use as standards by public utilities and manufacturers".



"The Mighty Pike", a one-picofarad capacitor used for calibration of high-voltage instrument transformers.

As is to be noted by viewing the picture, a 7-foot high, 7-foot diameter aluminum can encloses the sphere and disk which form the capacitor plates. The heavy paraffin-impregnated wooden framework serves to insulate the capacitor and to support the upper electrode. It also supports the cylinder containing the screw arrangement used to adjust the spacing between the sphere and the disk, and the connections between the sphere and the supply (at right rear) and test transformers. The plastic cover over the top of the can prevents the entrance of dust and dirt which could cause the capacitor to arc over.

ELECTRONICS LITERATURE

"TUBE SUBSTITUTION Handbook," Vol. 4; by Howard W. Sams Engineering Staff; Catalog No. TUB-4; 112 pages; price $1.50.

Tube substitution is often necessary and feasible. This is especially true where electronic apparatus must be installed in the "field" or in small communities distant from a distributor of tubes. Quite often it may mean the difference between continuity of service and no service.

Within the covers of the text are over 6,500 recommended substitutes, some 1,400 more substitutes than

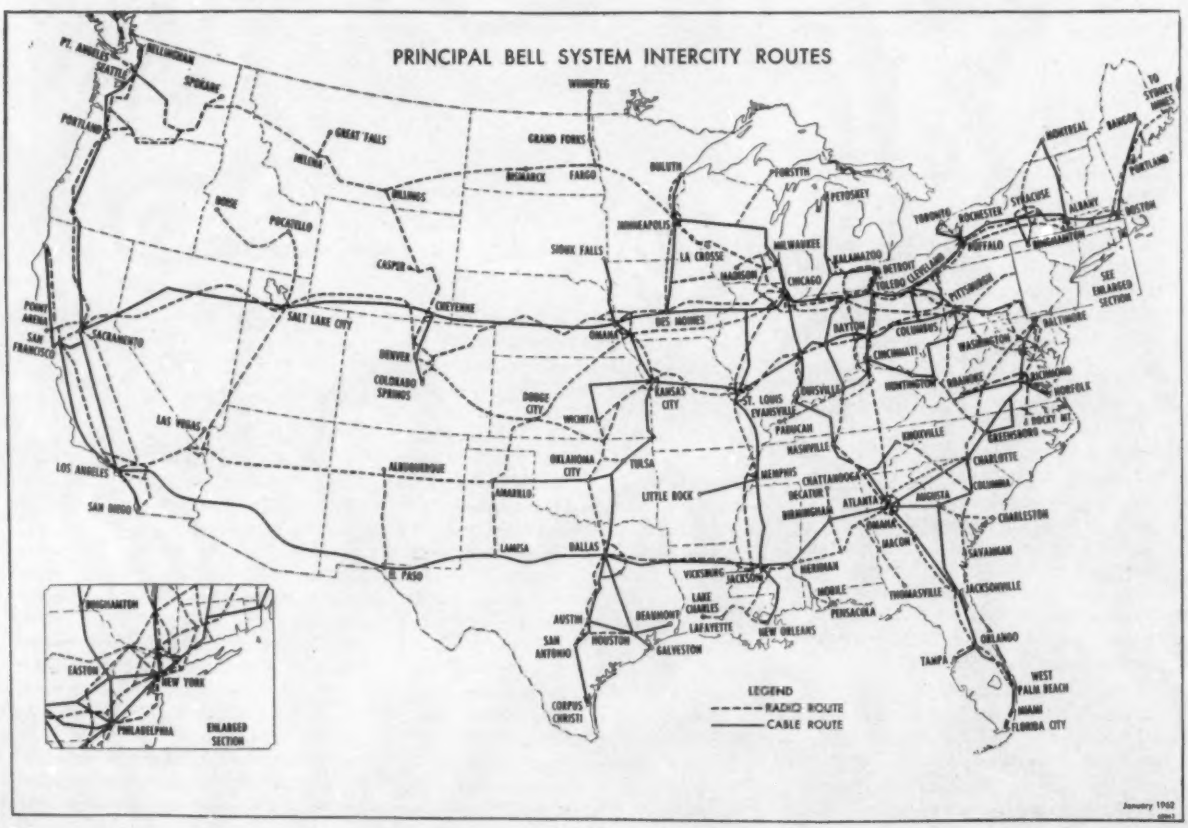
were covered in Volume 3. In addition, a new section on sub-miniature-type tubes listed some 250 substitutes for over 275 different sub-miniatures.

•

"BASIC PRINCIPLES and Applications of Relays," by Harvey Pollack; soft binding; 112 pages; price $2.90.

Relays are the heart of mechanical telephone switching systems and will continue to be used in electronic switching systems in the future to some degree. It is, therefore, necessary that the maintenance man and technician alike become familiar with the fundamentals of relay operation. This is especially necessary for new personnel in the telephone industry.

This text offers a comprehensive discussion of construction, operation, and application of relays at a technician's level. The initial chapter discusses the fundamentals of electro-magnetic relay construction. Additional chapters are devoted to relay contact arrangements, circuits for dc relays, electronic relay circuits, and relays in timing circuits. A final chapter discusses considerations to be used in the selection and application of relays. To assist the student in learning relay principles, review questions are included preceding each individual chapter.



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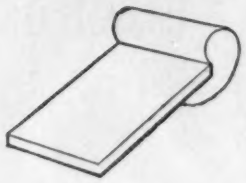
The Plant Man's NOTEBOOK



By RAY BLAIN, Technical Editorial Director

GENERAL TELEPHONE Co. of Florida has recently installed automatic call distributor service for Eastern Air Lines in the airline's Tampa office. This system distributes incoming calls automatically, direct to reservation clerks. When anyone calls in for a reservation and all clerks are busy, the telephone will continue to ring until a line becomes available. The call is then answered directly by a clerk who provides the reservation information.

Previously, PBX operators answered all incoming calls, and the customer was placed on "hold" until someone was available to handle the request. This arrangement often left a person waiting for some time and not knowing whether he had been forgotten by the operator.

The new system operates similarly to a cafeteria line—the first in line gets served first. If, for any reason, you get out of line without being served, you have to go to the end of the line when you return. Eastern's automatic call distributor operates in a similar manner—once you call, let the telephone continue to ring until answered. If you hang up before it is answered, you will go to the end of the reservation line when you call back.

Actually, the call will go through much faster with this new automatic system than when calls were routed through the PBX operator. Eastern makes continuous studies (trunking, lost calls, answering and holding time) to be certain that the office is manned adequately to handle properly incoming calls and reduce customer waiting time to a minimum.

The airline has a Telpak system connecting nine cities throughout the state of Florida. They have consolidated their reservation offices into one at Tampa, with agents at the other cities; and 82 lines connect directly into the Tampa office.

•

Many will remember the furor that was raised back in the heyday of radio when Bing Crosby began the tape recording of his programs. Listeners insisted that live shows be broadcast, even though they would probably have not been able to detect the difference had they not been told they were listening to a recording.

The majority of present-day TV programs are pre-recorded, and this method is accepted by the average listener without complaint. As a matter of fact, a better show is made possible by this method for the reason that programs can be edited, and mistakes corrected, prior to broadcast.

The average American just does not like change, but will, in due time, accept improvements and progress that would be impossible without change. This is evidenced by the present minority's objection in certain areas to all-number calling (ANC). There is some genuine and wishful concern on the part of a few telephone subscribers who find it difficult to give up familiar old numbers. The benefits, however, of ANC are many, and we do not have the slightest doubt that in time its numerous advantages will be recognized by everyone.

•

The first emergency reporting telephone system to be installed in the Mountain States Telephone & Telegraph Co. area was recently placed in service at Helena, Mont. This system will be of particular value in reporting fires, but will also be used by citizens for emergencies of all kinds.

Replacing the conventional glass and pull-lever alarm boxes, weatherproof, specially-marked telephones have been installed at 36 strategic locations throughout the city. Anyone wishing to report a fire or emergency may do so by simply lifting the receiver of one of the emergency telephones. They will be in immediate and direct contact with the dispatcher located at the central control switchboard at police headquarters. The dispatcher can then determine the nature of the emergency and send the proper equipment to handle the situation. In the case of an auto accident or robbery, for instance, he would immediately send a squad car, ambulance, or whatever other emergency police unit is needed. If a call from one of the boxes concerns a fire, he will transmit the information over a loudspeaker in the fire department area.

•

While driving busy highways recently, we noted that some of the turnouts have two telephone booths in service. This is undoubtedly good planning on the part of the telephone company because cars often will not stop and wait to make a call when they see that the roadside booth is busy.

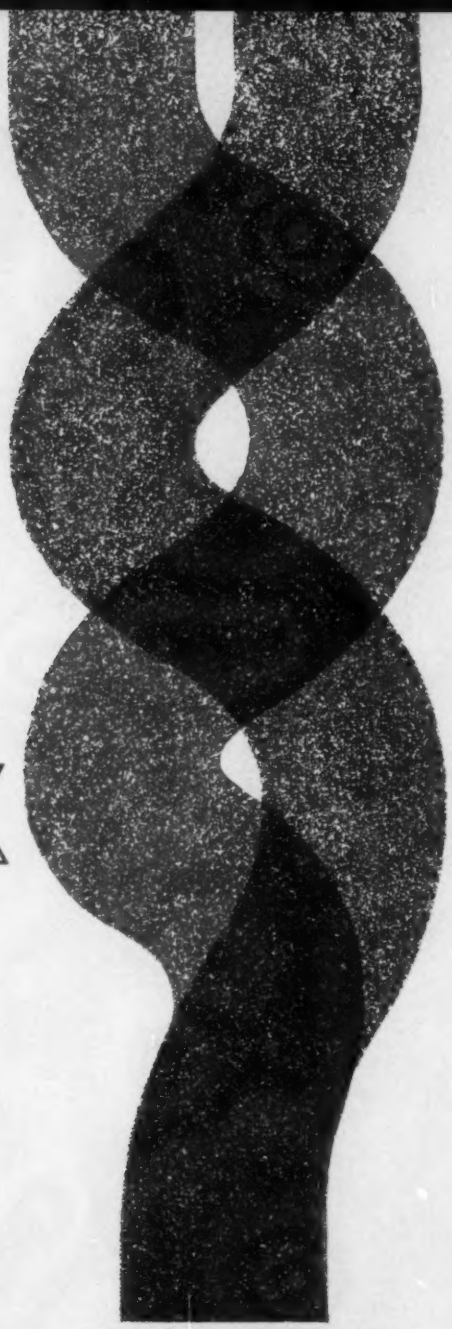
The Blain family makes rather frequent trips to the eastern shore of Maryland, and one turnout is a favorite spot for exercising our dog. This was also the location of a telephone booth. We had noted on several occasions that it had been broken into and apparently robbed. The telephone company finally decided that it was not a good investment.

It is a sad commentary on our times when vandals prohibit the furnishing of a necessary public service. There is no doubt that some day we shall have a burglarproof public telephone to combat this condition.

•

Fire officials in the Washington, D. C., area are making an all-out effort to halt a recent wave of false alarms. As many as 12 false alarms are received in a single night. Two needless calls in one week triggered accidents. One fire truck slammed into an ambulance and another into a car. In both cases, the trucks were responding to a false alarm from the same pull box.

Seven of the pull boxes located in the area where most of the false alarms originate are being equipped with Arresto-Alarms in an effort to cope with this nuisance. When the lever is pulled, an electric horn mounted on the box will emit a weird wailing sound somewhat like the bel-



YORK PITMAN

WE'RE SPLICED

Significant connection! York Body, producer of all types of telephone bodies since 1894, has joined forces with Pitman Manufacturing Company of Grandview, Missouri, maker of hydraulic lifting and digging equipment. Purpose: to develop new, more efficient communication equipment through the integration of the product lines and creative engineering talents of both organizations. As a result of this new partnership, we expect to make important contributions to the telephone industry's never-ending battle to reduce costs per man-hour.

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low of a wounded bull. This sound will continue for 40 seconds and can be heard a block away.

In an effort to catch offenders "red-handed", some boxes are being painted with a special solution that rubs off. It is not visible in natural light and is difficult to wash off but shows clearly on a suspect's hands under the beam of ultraviolet light.

In our opinion, it is safe to predict that if the nation capital's 1500 pull boxes were to be replaced with emergency reporting telephones, the false alarm problem would be immediately reduced materially, and perhaps even eliminated entirely.

•

We have never been an avid TV watcher, and a half hour at any one sitting is generally our limit. The day Colonel Glenn made his orbital flight was an exception, however. On that day, we turned our set on at 6:30 a.m. and were glued to it until nearly six o'clock in the evening.

While this flight unquestionably proved many scientific principles, it also proved the importance and value of reliable communications.

•

The police in Essen, Germany, are to have direct radio communication with the city's 65 radio-equipped taxi cabs. With this arrangement, it will be possible for any citizen to hail a radio-equipped taxi and request the driver to call the police.

This is the first phase of a new program in which police patrol cars, fire engines and ambulances will be linked with radio-equipped taxis. Later, electricity and water service vehicles and the railway police will be brought into the network. This new arrangement, which is being tried out for the first time in Germany, will enable all emergency services to be called within a matter of seconds.

•

The world's telephones increased at the rate of about one every four seconds during 1960. By the first of 1961, it was found that the number of telephones in the world totaled 141.7 million, a gain of 8.1 million over the previous year. More than half this gain was in the United States.

"Cross Talk"

It is said, two years are required for a child to learn to talk; and 50 years are required for a man to learn to keep his mouth shut.

•

Those with the most to say usually say it with the least words.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. Is it possible to make use of a suppressor of some type to reduce the noise on an open wire circuit?

A. Yes. A device of this type has been developed that operated satisfactorily, but for some unknown reason, it has not been extensively used. This noise suppressor is an electronic device designed to change the signal to noise ratio on telephone circuits, thereby reducing the amount of noise heard by the listener, without reducing the volume of the talker's voice to the listener. This suppressor will reduce by at least 18 dba the noise on any open wire telephone circuit that is not equipped with terminal telephone repeaters. This means that the following reduction in noise will be obtained:

Toll Circuit Noise—dba.		*Toll Circuit Noise — Noise Units*	
Without	*With*	*Without*	*With*
35	17	400	50
40	22	700	90
45	27	1240	160
50	32	2240	280
53	35	3200	400

Toll circuits more than 35 dba above reference noise, or with more than 400 noise units, are usually considered unsatisfactory for toll traffic. In addition to reducing noise, the suppressor will reduce the transmission loss of the toll circuit by about 2 db, or the equivalent of loading a 3-mile 19-gauge, non-loaded cable phantom circuit.

•

Q. Can you recommend a good practical book on stereophonic sound?

A. It is suggested that you obtain a 128-page, soft cover book authored by Norman H. Crowhurst and titled: "Stereophonic Sound". It may be purchased from TELEPHONY for $2.25.

This book is the first true assessment of this exciting new medium. It provides the information required to add this new dimension to hi-fi listening pleasure. In an easy, interesting style, the author explains the theory of stereophonic sound; the difference it can make in listening pleasure; what goes into making it successful and various systems available or likely to become available.

The author, a world-renowned authority on the subject, covers such systems as binaural, two and three channel stereophonic, stereosonic, coded-stereophonic, and the use of these systems with radio, disc, tape and other "media". This information is applied to selection and placement of the speakers for the best home stereo reproduction.

•

Q. Is it true that even count plastic-insulated cables never have any extra pairs?

A. Even-count PIC cables of 25 pairs and larger are made up of even multiples of 25 pairs—50, 75, 100, 150, 200, etc. In some wire-armored cables, such as single and double-armored submarine cables, one or more extra pairs are usually provided to serve as replacements in the event that defects occur in the remaining pairs. These extra pairs are distinctively coded so that they may be readily distinguished from the regular pairs.

•

Q. When parallel type drop wire is installed, should it be twisted to prevent cross talk?

A. We doubt that twisting is necessary to prevent cross talk. It is, however, generally considered a good practice to give this wire one complete turn in approximately each 10 feet of span length to reduce vibration and dancing. This procedure is especially desirable in high wind areas.

•

Q. Give the maximum resistance that can be tolerated in a central office ground.

A. The lower the resistance, the better, and a resistance of five ohms, or less, is generally considered to be desirable for the protection of the central office equipment, as well as to provide for the system's proper operation.

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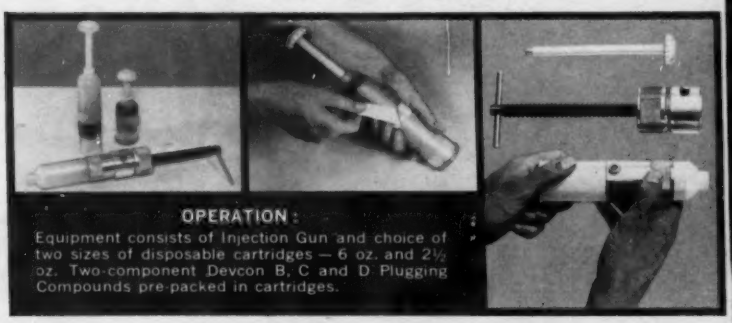
Safe • Quick • Easy • No Cleaning
No Skin Contact
Use B, C or D Compounds

Save time in mixing epoxy resin and activator. Eliminate any cleaning of gun. B COMPOUND is recommended specifically for plastic insulated cable; C COMPOUND is especially made for paper insulated lead sheath cable; all-around D COMPOUND will suit *either* application. All three resins are available in 6 and 2½ ounce cartridges. The LD-755 Gun has a lifetime warranty.

Devcon Corporation, Danvers, Massachusetts



OPERATION:
Equipment consists of Injection Gun and choice of two sizes of disposable cartridges — 6 oz. and 2½ oz. Two-component Devcon B, C and D Plugging Compounds pre-packed in cartridges.

1. Remove tape clinch band from cartridge.
2. Rotate dasher rod until material is completely mixed.
3. Remove dasher rod and insert cartridge in Injection Gun for application.
4. Attach fitting to cable and eject resin.
5. Remove cartridge from gun and discard.

Patent No. 2,838,210 (others pending)

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They may have found that the "cheap" electric Plant actually costs as much as an Onan. Maybe more. They might have bought a stripped down Plant with an attractive "list." And then discovered that "price adders" for such essentials as oil pressure and water temperature gauges, radio suppression—even mufflers!—brought the actual price of a ready-for-work "bargain" above Onan's fully-equipped cost.

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There are lots of other good reasons why Onan is the World's Leader. Factory trained franchised distributors, local parts and service, one-source responsibility . . .

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Onan

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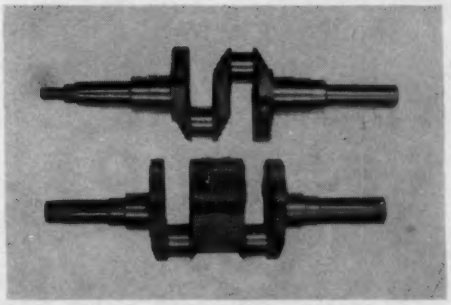
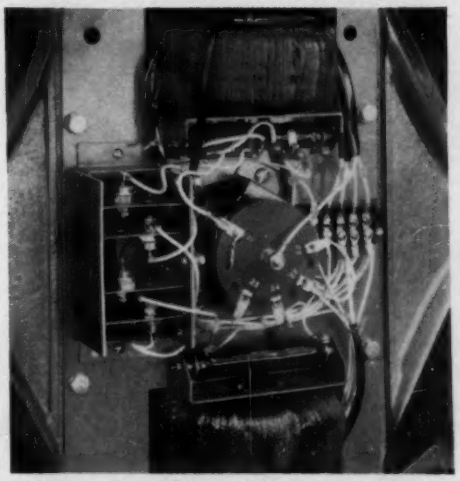


Onan's bigger, stronger crankshaft, compared to typical competitive part, typifies the extra ruggedness Onan builds into all Electric Plants.



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Another Look at Joint-Use Contracts

A discussion of the evolution, associated agreements and economic potentialities of joint construction.

By MARTIN J. LUICHINGER*

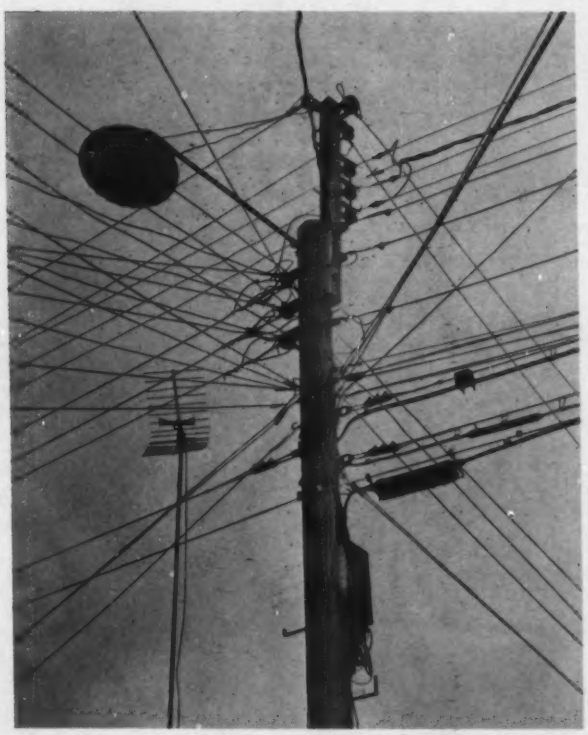
THE PRACTICE of joint-use of wood poles by power supply and communications companies, as it is known today, is the result of many years of experience and study by both the power and telephone companies.

Before going into the relative merits and economies of joint construction, it is believed that a quick review of the background history is in order.

The practice of both power and telephone companies occupying the same poles began about 80 years ago, in a rather haphazard fashion. Occupancy was for the most part by acquisition, without the process of negotiations, except on an occasional, after-the-fact, basis. Since there were no standards governing the rights, responsibilities and safety requirements, this type of joint occupancy very often resulted in plant conditions that presented serious hazards to both life and property.

After some disastrous experiences resulting from these hazardous entanglements (See Fig. 1), it was obvious that this practice required some guidance so as to bring order out of

*Mr. Luichinger is a Consulting Engineer in Indianapolis, Ind.



LEFT: Fig. 1. Hazardous entanglements. Oddly enough, conditions such as this were not confined to the early days. This photo was taken in March of this year. RIGHT: Fig. 2. Present-day joint-use. The telephone company's 50-pair cable uses about 1 foot of space, whereas the power company is using about 16 feet. These are 45-foot poles.

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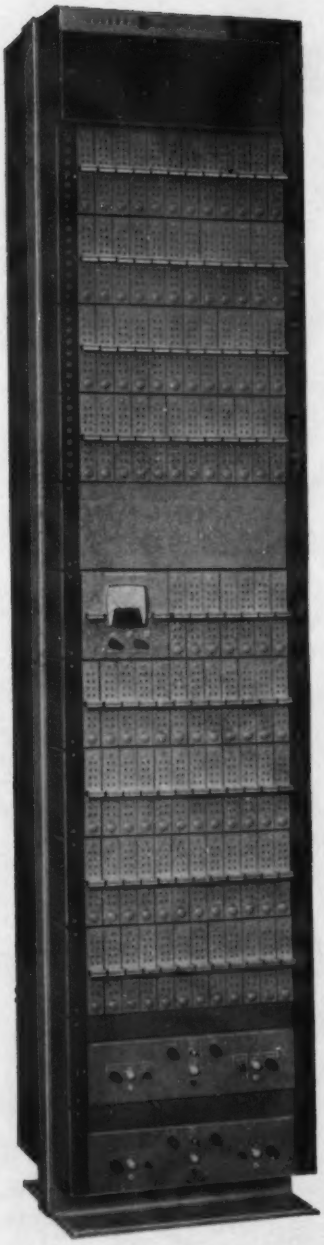

Among those companies that have already selected G-E telecommunications equipment are Western Union, New York Telephone Company, Florida Telephone Corp., Parker Valley Telephone Company, Highland Telephone Cooperative and United Telephone Company of the West.

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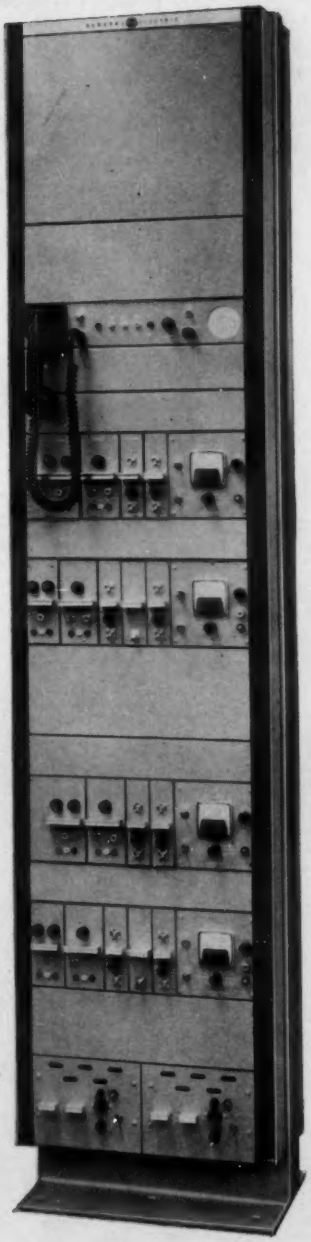


For complete information on General Electric transistorized telecommunications systems, call W. E. Evans, Area Code 703, 846-7311, or write Section 3541-28, Communication Products Department, General Electric Company, Mountain View Road, Lynchburg, Virginia.

GENERAL ELECTRIC

inevitable chaos, which marked the beginning of joint-use agreements and/or contracts. These agreements and/or contracts appeared in many forms, ranging from an exchange of letters to a variety of contracts which followed no specific pattern, but it was a beginning.

It was somewhere between 1900 and 1910 that the formal written agreement or contract came into being. These early agreements, or contracts, were very crude. They were, of course, based on operating experience gained up to that time, although sometimes through grim sources, and for the most part played by ear, particularly with regard to the legal, future development, specifications and other technical aspects.

In the absence of any recognized guidance and sufficient experience in the matter of joint-use, there was no uniformity in the approach, and, as a result, a variety of conditions was injected into the various types of contracts, establishing questionable precedents that have since been difficult to dissolve.

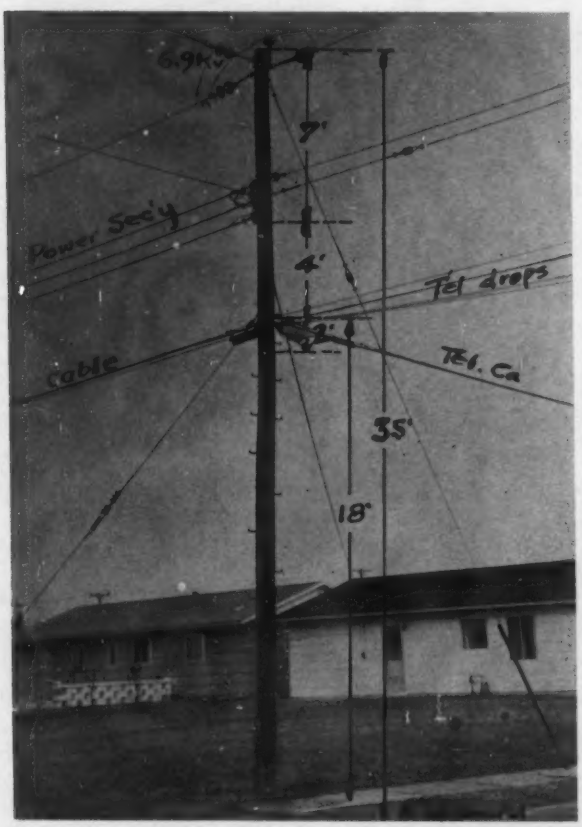
Regardless of the type of contract, there are certain basic items that should be specifically covered, e.g., (a) the normal or standard joint pole, (b) construction specifications, (c) provisions for changing conditions, and (d) liability clause, legal aspects, to name just a few.

Of these items, the normal or standard joint pole is very important, since it constitutes the base for computing the rental rate. The original basic concept of space allocation on the standard 35-foot pole was relatively simple:

Pole top	1 foot
Power company, two crossarms	2 feet
Separation or clearance space	4 feet
Telephone company, two crossarms	2 feet
Ground or road clearance	20 feet
Depth of setting pole	6 feet
Total, or pole height	35 feet.

From these figures, it is obvious that the space allocation is 50-50,

Fig. 3. Forest of poles. Separate lines under such conditions create objectionable conflicts.



LEFT: Fig. 4. Modern joint use. The space ratio for this case, using only clearance space as common, is: Power company—7 feet plus (½ Cl. 4 feet) = 9/13 or 69.2 per cent. Telephone company—2 feet plus (½ Cl. 4 feet) = 4/13 or 30.8 per cent. This roughly is a ratio of 31—69. RIGHT: Fig. 5. Part of same contact.

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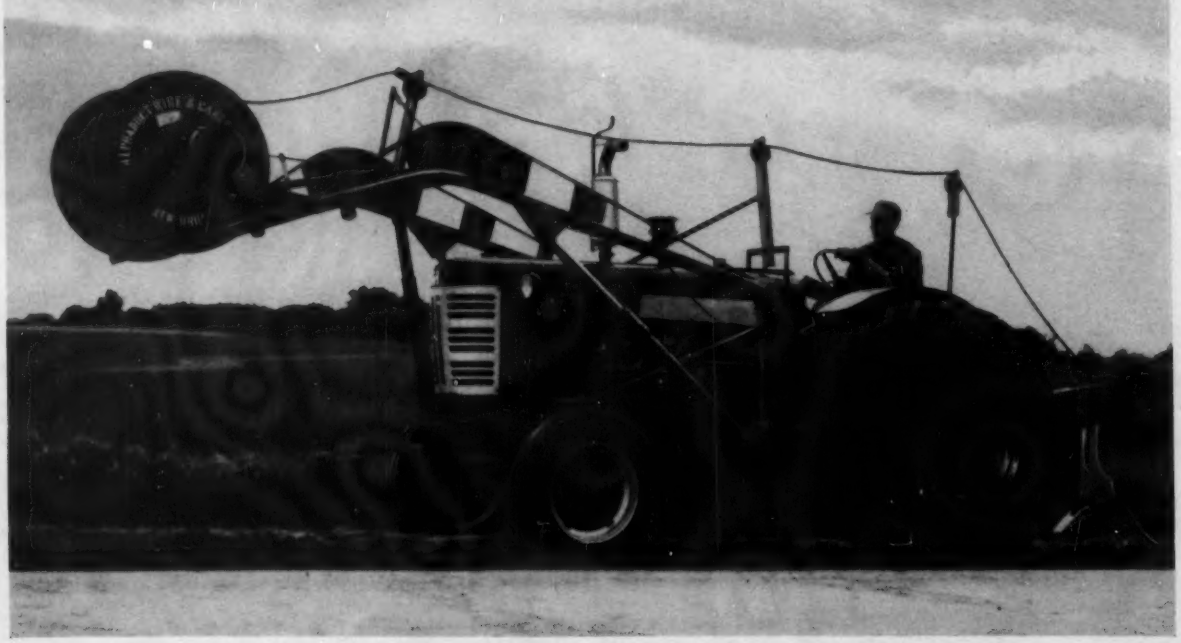


whether the allocation is based on utilized space and one-half of the separation, or utilized space and one-half of all the common space.

Thus, the original theoretical division of costs was on a 50-50 basis for all types of contracts. This reasoning also implied an equal distribution of the joint poles owned by each company. In other words, the ownership of all jointly used poles should adhere to the 50-50 ratio.

One important point that was not taken into consideration was the future developments and expansions of both power and telephone companies and the effect thereof on their respective space requirements on jointly-used poles.

Capacities Increased

As the service demands of both companies expanded, it was obvious that their service capacities had to be increased. In the case of the power company, this meant additional primary feeders, and eventually higher primary voltages, which, in turn, increased the clearances and associated space requirements. In the case of the telephone company, however, which during the early days of joint-use utilized mostly open wire facilities, it was obvious that to meet the increased service demands the open wire would have to be displaced in favor of aerial cable, utilizing a relatively small part of the original 2 feet.

However, with the attachment of an occasional aerial cable terminal and associated service drops, the original 2 feet was, and still is, more than ample, especially since, currently, the terminals are, for the most part, mounted along the strand, where 1 foot space would be sufficient.

Power Requirements Increase

Therefore, with the advancement and expansion of both power and telephone services over the past 50 years, the power company's space requirements have increased considerably, whereas the telephone company's space requirements have remained materially unchanged.

It is also important to note that, as the power companies increased their facilities, additional mechanical stress was placed on the joint pole, calling for an increase in the class of pole, whereas in the case of telephone companies, the old aerial cables, which were of lead sheath or a composition that approximated lead in weight per foot, have been displaced by much lighter cables.

Examples of Lightness

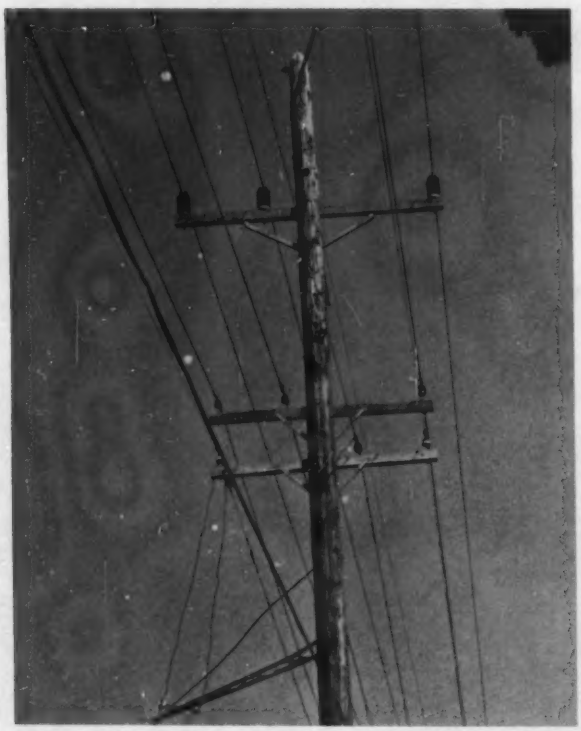
Along about 1946, Alpeth, or plastic type sheath, began replacing lead and the weight of cable for comparable sizes was greatly reduced. For instance, a 200-pair, 24-gauge cable having lead sheath had a diameter of 1.1 inches and an average weight of 1.7 pounds per foot, whereas the present-day Alpeth cable of comparable size has a weight of 0.79 of a pound per foot. A reduction of 54 per cent in weight for the same service capacity, or the current 152-pair, 22-gauge Alpeth cable has the same weight as the old 51-pair, 22-gauge lead-covered cable.

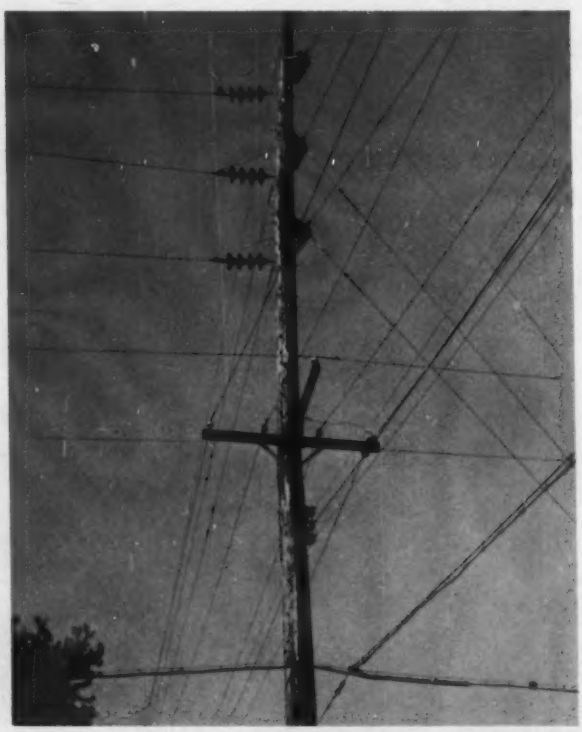
Thus, while the mechanical demands of power companies' facilities on a joint pole have increased the strength requirements of the pole, the telephone company, with its lighter cable even in the larger sizes, has had very little, if any, change in the class requirements of the joint pole, except in the case of ice and wind loading.

Thus, it can readily be seen that the original space requirement ratio has departed considerably from the 50-50 base and consequenty the rental rates derived therefrom are no longer equitable.

A typical example of present-day joint-use is shown in Fig. 2, with the telephone company's space requirement relatively small as compared to that of the company.

(Continued on page 62)





LEFT: Fig. 6. High tension (34.5 KV) joint-use. Sixty-five foot pole and one 101-pair telephone cable. RIGHT: Fig. 7. High tension (34.5 KV) joint use. Seventy-foot corner pole and one telephone cable.

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MAGNOLIA GLAYZ-IT TELEPHONE REFINISHER BOMBS—Cleans, revitalizes, preserves the surface. Code M-115—Packed 12-12 oz. bombs per cs. Wt. 13#—Used by at least 5000 Telephone Exchanges in the United States.

MAGNOLIA MAGNA-CLEAN—Especially adaptable for cleaning, disinfecting and deodorizing Telephone Receivers and Transmitter Caps—Code GDC-1—Packed 12-16 oz. bombs per cs. Wt. 16#.

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Traffic Load Measurements of PBX and PABX Trunks to C.O.

By E. W. SLATER*

THE PURPOSE of a traffic study, which is an accurate and detailed measurement of traffic flow through telephone conversational paths, is: (1) To determine the adequacy of the existing trunks, and (2) to obtain data for engineering use.

The various services requiring this essential information may be broadly classified as follows:

(1) Rotary trunk groups.

(2) Private Automatic Branch Exchange (PABX) installations of 100 lines or more.

(3) Telephone company central offices.

(4) Measurements of line and/or trunk usage between points of community interest to determine feasibility of line concentrators.

(5) Studies for toll separation purposes.

Items 1, 2 and 3 are the more general type of studies, while Items 4 and 5 require special handling with each case being treated separately, according to the circumstances involved.

Rotary Trunk Groups

Rotary trunk groups may vary in size from two consecutively-assigned numbers to a customer to any number greater than two. Usually, however, the number of trunks will be 10 or less and they are terminated on a special rotary-type connector board in the central office. The feature that distinguishes the connector switches for this particular form of service from that of the individual line subscriber is the automatic rotary or rotation that will occur to find an idle trunk.

For example, if the subscriber numbers were 5-2481 and 5-2482, it would mean he has two trunks to the central office. Dialing 5-2481 will automatically connect with 5-2482 if the first trunk is busy. Similarly, if there are 10 trunks, the numbers would have been 5-2481 through 5-2490, and if nine trunks had been busy, dialing 5-2481 would automatically cause the switch to rotate across to the 10th, or last trunk. Since 10 is the most that can be accessed or contacted on any level of a switch bank, trunk groups of 11 or more trunks are connected to level-hunting rotary switches, which permits number sequences to be made in multiples of 10.

This type of service is used by business firms to whom customer accessibility is most important. However, in many instances, until advised by telephone customer service consultant specialists, business subscribers may not be aware of, or making full use of, the whole spectrum of telephone service available to meet their individual needs and desires. Realizing this, well-deserved emphasis has been placed on the development and promotion of this segment of the telephone market. In particular, it has been found that the service rendered to the customer by the study of his PBX or PABX trunk groups is appreciatively received, improving customer relationships, and results in worthwhile increases in annual revenues.

Objectives of Study

Intra-office trunking paths in a central office are designed to provide a basic minimum grade of service of one lost call per 100 calls, and this quality of service (or better) is under the control and administration of the telephone company. The importance of the connecting trunks to and from the PBX customer and the central office, as a integral part of his installation, has not been overlooked.

The following substantiating quotation is from an article, "The Traffic

(Continued on page 42)

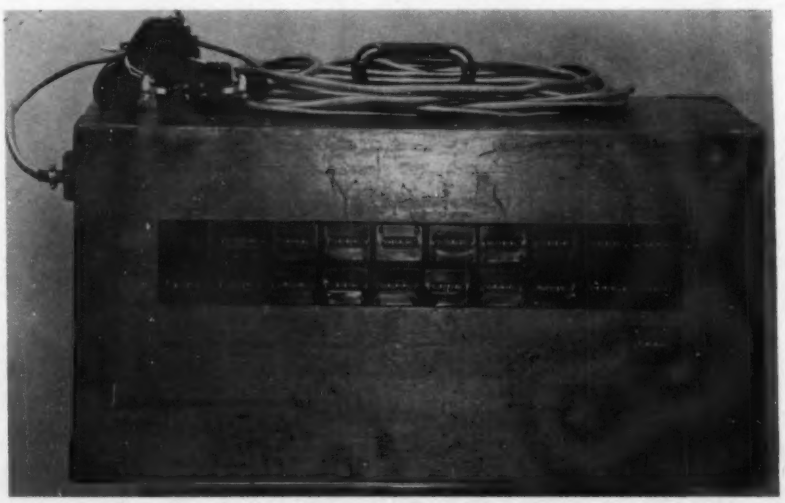

Fig. 1. Portable small trunk group traffic scanner. Top Row—Pegcount meters for Trunks 1 to 10; Second Row—scanning meters for Trunks 1 to 10; Third Row—On a 10-trunk rotary group, the overflow meter will register total time in seconds when all 10 trunks are simultaneously busy. Also shown are the "long lead" and "short leads" used to make connections to desired connector board normals.

*Mr. Slater is Dial Traffic Engineer of General Telephone Co. of California.

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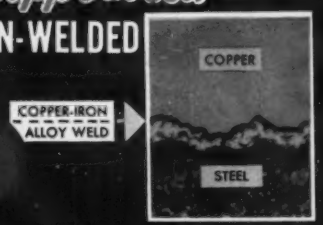

This microphotograph of the Molten-Weld in Copperweld shows how the grains of copper and steel interlock to form a permanent, continuous weld. Copperweld is the only company producing wire which has this inseparable weld.

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Copperweld's superior performance and longer life have been thoroughly demonstrated by thousands of companies all over the world. During the past 45 years they have put into service enough Copperweld to circle the globe more than 100 times. That's because their records have shown that Copperweld will do a better job, and do it at lower cost, than any other line wire.

The basic advantage of Copperweld Line Wire is a unique method of manufacture—the Molten-Welding process, in which a uniformly thick sheath of pure copper is inseparably welded to an alloy steel core. The two metals are permanently interlocked and act as a single material.

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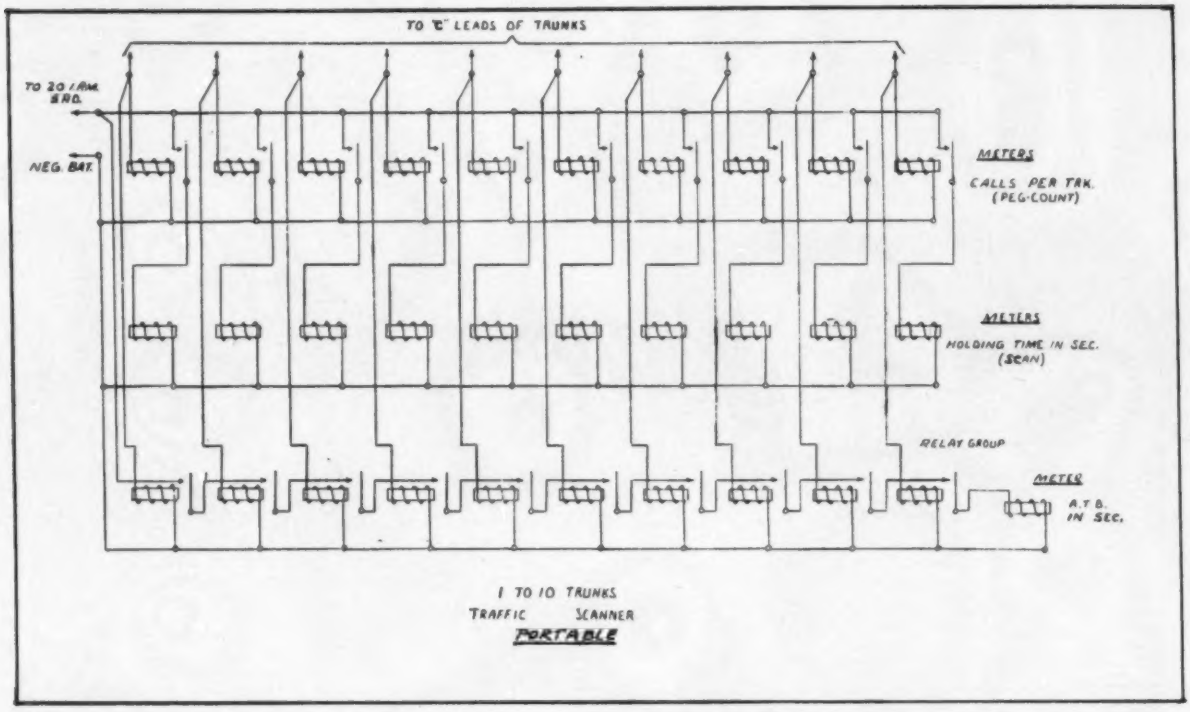

Fig. 2. Schematic wiring diagram of portable traffic scanner suitable for use on small rotary trunk groups, shown in Fig. 1.

Department's Part in Public Relations," by Betty Wyman (TELEPHONY, Oct. 21, 1961):

> "A recent study tells us that, while these customers constitute only a very small percentage (approximately one-half of 1 per cent) of total accounts, they represent 15 per cent of total telephones. Also, and listen to this, more than 25 per cent of all local switched messages and more than 50 per cent of long distance messages originate or terminate at PBX switchboards."

Trunking to and From C. O.

During the initial installation, careful consideration is given to provide an adequacy of trunking to and from the central office. But, as the business grows, additional telephones are added, all of which will generate an added proportion of the traffic load, inward and outward, over the central office trunk group. Station increases, without corresponding increases in the central office trunks, will result in a deterioration of the original service grade provided.

Unavailability of central office trunks will, of course, prevent customer accessibility in both directions. This condition is far removed from the ideal, which has a high degree of acceptability for all calls, whether of local or long distance origination.

It is of great importance, therefore, to the customer and to the telephone company that all necessary steps be taken to increase for mutual benefit the probability of completion factor for each call.

Analyzing Customer's Requirements

Traffic engineers are accustomed to determining the number of trunks required on the basis of converting all the various circuit occupancy times of telephone calls into basic units of 100 seconds' duration. These CCS (100-call second) values are applied to standard trunk load capacity tables and converted into trunks required. An excellent device for this purpose is the Automatic Electric Co. 10-line Trafficorder, which will scan individually or collectively up to 10 trunks. It has the added advantage that the scan meters are direct reading in values of unit calls or 100-call seconds, and require no calculation but may be directly applied to the traffic tables.

Assume we have studied the five trunks of the Smalltown Stock & Bond Co., and measured a Busy-Hour load of 84 CCS. Applying this value to Table I, we find seven trunks should be provided. In addition, by finding the nearest equivalent value on the five trunk line, we find that the mathematical probability of .09, or nine lost calls per 100 calls, is the grade of service being provided.

Data Help Sell T.unks

This information will, in most cases, be sufficient to result in customer willingness to provide the two additional trunks required for service improvement. However, studies which are taken with the intent of increasing the sale of additional trunks must be treated with the need in mind to anticipate any sales difficulties or questions that may arise.

Such questions, while not having any bearing from a purely technical standpoint on the trunk requirement determination, may be of great interest and value to the customer. Questions of this nature are: How many calls do we have during each day? How many calls are handled by our PBX board during the Busy-Hour, and what is the duration of the average call?

To obtain this information it is necessary that we not only scan the trunks to obtain our standard measuring unit of 100 seconds, but also peg-count each call.

Equipment Required

Those readers who have access to the commercially-available Trafficorder and similar types of equipment have no doubt been applying the principles outlined in this article, and have been rendering careful thought and consideration to grades of service applicable to varied needs of the com-

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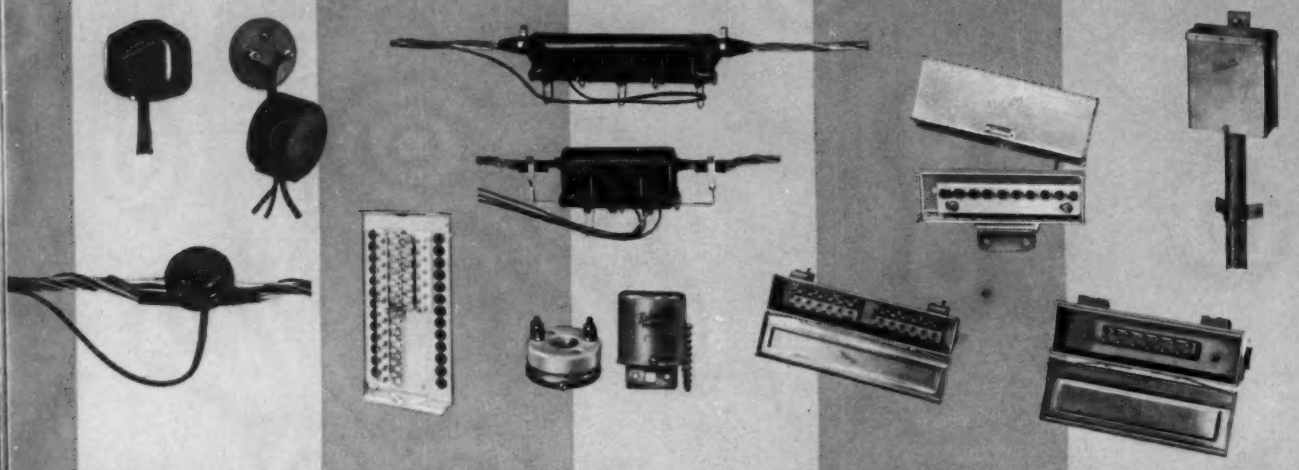

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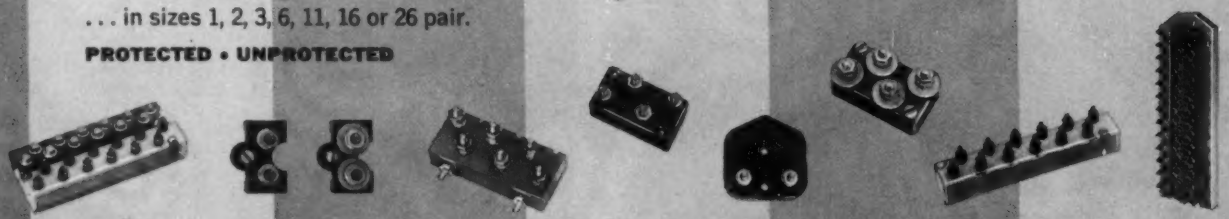

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mercial customer. However, for the benefit of those who may wish to ascertain, at first-hand, the worthwhileness of this subject matter before investing in traffic study equipment, there is shown in *Fig. 1*, a simple traffic measuring set which could be utilized for small trunk group study, (See *Fig. 2* for schematic diagram of this scanner).

This would consist of a portable meter box, with 10 pegcount meters and associated with each pegcount meter one scan meter, which permits the study of any combination of rotary trunk groups up to a total of 10. The combination might be, for instance, two trunks to Company A, three trunks to Company B, and the five trunks to the Smalltown Stock & Bond Co., or any variation within the limits of 10. The procedure would be as follows:

C. O. Battery on Each Meter

Central office battery is applied to a common connection which puts the central office battery on each meter. The traffic register or meter will be operated when the circuit is completed by a ground supplied to the other side of the meter. Under this condition, the pegcount meter armature will be attracted to the core, and in so doing closes two contacts which complete the circuit through the associated scan meter. As long as the ground is supplied to the pegcount meter, it will be held up, and, of course, without provision of an interrupted ground, so would the scan meter.

Two sources of ground are, therefore, required, the steady ground supplied by the "C" or "control lead" of the connector normal in use, and an interrupted ground which will cause the scan meter to be alternately released and actuated at regular time intervals as long as the pegcount meter remains seized. This interrupted ground could be conveniently supplied by the 20 IPM (20 interruptions-per-minute) timer circuit operating the dial tone delay relays mentioned in a previous article.

The scan meter, therefore, will accumulatively count once every three seconds it is held up, and if the pegcount meter registered one call, and the scan meter registered 30 counts, we would know that one call equalled 30 x 3 = 90 seconds in duration.

Taking the Actual Study

Let us assume that we have received a request from the Unit Sales Manager to study the following rotary trunk groups:

Smalltown Stock & Bond Co.
Company A
Company B

1 in 100 to 10 in 100
Call Loss Tables

CAPACITY TABLE, IN CCS

POISSON BASIS - P - .01 to .10 INCLUSIVE

Trunks Per Group	.01	.02	.03	.04	.05	.06	.07	.08	.09	.10	Trunks Per Group
1	0.36	0.73	1.10	1.47	1.85	2.23	2.61	3.00	3.39	3.79	1
2	5.4	7.9	9.7	11.3	12.9	14.2	15.5	16.8	18.0	19.1	2
3	15.7	20.4	24.0	26.9	29.4	31.7	33.9	35.9	37.8	39.6	3
4	29.6	36.7	41.6	45.7	49.1	52.	55.	58.	60.	63.	4
5	46.1	56.	62.	67.	71.	75.	78.	81.	85.	88.	5
6	64	76	83	89	94	99	103	107	110	113	6
7	84	97	105	112	118	123	128	132	136	140	7
8	105	119	129	137	143	149	154	159	163	168	8
9	126	142	153	162	169	175	181	186	191	195	9
10	149	166	178	188	195	202	208	214	219	224	10
11	172	191	204	214	222	230	236	242	248	253	11
12	195	216	230	240	249	258	264	270	277	282	12
13	220	241	256	267	277	286	292	299	306	311	13
14	244	267	283	295	305	314	321	328	335	341	14
15	269	293	310	322	333	342	350	357	364	370	15
16	294	320	337	350	362	371	379	387	394	401	16
17	320	347	365	378	390	400	409	416	424	431	17
18	346	374	392	407	419	429	438	446	455	462	18
19	373	401	420	436	448	458	468	476	485	492	19
20	399	429	449	465	477	488	498	506	516	523	20
21	426	458	478	494	507	517	528	537	546	554	21
22	453	486	507	523	536	547	558	567	577	585	22
23	480	514	536	552	566	577	589	598	607	616	23
24	507	542	564	582	596	608	619	629	638	647	24
25	535	571	593	611	626	638	650	660	669	678	25
26	562	599	623	641	656	669	680	691	700	710	26
27	590	627	652	671	686	699	711	722	731	741	27
28	618	656	682	701	717	730	742	753	763	773	28
29	647	685	711	731	747	761	773	784	794	805	29
30	675	715	741	762	778	792	804	815	826	836	30
31	703	744	771	792	809	823	835	846	858	868	31
32	732	773	801	822	840	854	867	878	890	900	32
33	760	803	831	852	871	885	898	909	922	932	33
34	789	832	861	883	902	917	930	941	954	964	34
35	818	862	891	913	933	948	961	973	986	996	35
36	847	892	922	944	964	979	993	1005	1018	1028	36
37	876	922	952	975	995	1011	1024	1037	1050	1060	37
38	905	952	982	1006	1026	1042	1056	1069	1082	1092	38
39	935	982	1013	1037	1057	1074	1087	1101	1114	1125	39
40	964	1012	1043	1069	1088	1105	1119	1133	1146	1157	40
41	993	1042	1074	1099	1120	1137	1151	1165	1178	1190	41
42	1023	1072	1104	1130	1151	1168	1183	1197	1210	1222	42
43	1052	1103	1135	1161	1183	1200	1215	1219	1243	1255	43
44	1082	1133	1166	1192	1214	1232	1247	1252	1275	1287	44
45	1112	1164	1197	1223	1246	1263	1279	1284	1308	1320	45
46	1142	1194	1228	1255	1277	1295	1311	1316	1340	1352	46
47	1171	1225	1259	1286	1309	1327	1343	1348	1373	1385	47
48	1201	1255	1291	1317	1340	1359	1375	1381	1405	1417	48
49	1231	1286	1322	1349	1372	1390	1407	1413	1438	1450	49
50	1261	1317	1353	1381	1403	1422	1439	1455	1470	1482	50

Table I. CCS capacity table for trunks from 1 to 50, and service grades from .01 to .1 (one lost call per hundred calls to 10 lost calls per hundred calls).

The meter box is placed in the Smalltown central office convenient to the 52400 connector board which, being used for rotary type service, may have more than one shelf. Multipled together at the end of each shelf will be found an 8x50 pin terminal block, upon which is terminated the "T" Tip, "R" Ring, "C" Control Lead, and the "EC" Extra Control leads for each of the 100 numbers possible for this board. The meter leads are connected:

1 to 5 to "C" pin of Nos. 52421-52425
6 to 7 to "C" pin of Nos. 52481-52482
8 to 10 to "C" pin of Nos. 52495-52497

When the trunks are in use (busy) ground will be on this "C" terminal, hold up the pegcount meter and actuate the scan meter. When the trunk is released (not busy), ground is removed, pegcount meter armature falls back, opens the scan meter contacts, and the scan meter stops operating.

(5) Rotary Trunk Nos. 52421-52425
(2) Rotary Trunk Nos. 52481-52482
(3) Rotary Trunk Nos. 52495-52497

Based on Busy-Hour Load

PBX Rotary Trunk requirements, like other trunk groups, are based on a Busy-Hour traffic load. Unfortunately, this Busy-Hour is not known, nor will it be consistent from day to day, or even from hour to hour. This fortuitous characteristic of telephone traffic is more noticeable on small trunk groups than in the larger central offices where, due to the intra-office trunking, a certain "smoothing" effect takes place.

Furthermore, some firms, due to the nature of their business, will have the Busy-Hour in the morning, while

(Continued on page 84)

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Trouble Clearing

Central Office Protection—Section 2

By L. N. Martin

IN THE FIRST section of this article (TELEPHONY, Feb. 24, p. 19), we discussed main frame protectors. In some of the older offices, fuses are used in addition to the heat coils and carbon blocks. These fuses are of the long tubular type formerly used in station protectors and terminals. They are usually wall-mounted and frequently adorn (?) one entire wall of the terminal room from floor to ceiling. Such fuses have not been installed in new offices for many years.

When the project to dispense with these fuses was first started, certain requirements had to be met before they could be omitted or removed. However, these requirements may no longer apply. If a company has these fuses in its office and wants to get rid of them, we suggest that it consult a competent telephone engineer. It may turn out that it can remove them without expensive changes.

PART 85. The preceding article in this series appeared in the Feb. 24 issue.

48 Volts Dangerous

Forty-eight volts may be considered a very low and harmless potential by a power man who measures his potentials in kilovolts. However, it can cause serious damage to telephone equipment. Watch an electric welder at work—the arc melts steel as if it were wax and it is so bright the welder must wear very dark glasses in his helmet. He uses only 50 volts (but the current may be quite large). It should be noted however, that 50 volts has little or no striking distance. The welder must first actually touch the work with his rod, then lift the rod a short distance from the work to draw out the arc.

Look over the tools in any telephone office. You will usually find a screwdriver or a pair of pliers that bears evidence of having at one time shorted out 48 volts. Drops of what once was molten steel mark the spot where the arc occurred. The central office battery has a very large current capacity and, hence, can produce a very large current when shorted or grounded.

Fuses Act as Guard

Yes, 48 volts can melt metal, set fire to combustible materials, and burn the hands or the eyes. Fuses are used to guard against this hazard and they must be small and fast operating. They must stop the current before it has had time to damage the equipment. Furthermore, the operation of one fuse must not put a large amount of equipment out of service. Therefore, a large number of fuses are used. Each has a capacity of .5 to 5 amps—most of them about 1½ amps. Each protects only a small portion of the equipment. No more than one switch or one cord circuit can be disabled by the blowing of one fuse. While this may be the primary reason for this system of fusing, it also serves another very important purpose.

"Indicating" fuses are used. The individual fuse that has blown is indicated by the display of a glass bead, one or more pilot lights being lighted, and the fuse alarm bell ringing. Upon hearing the alarm bell, the attendant is guided to one row of fuses by the pilot lights, and by a glance along this row he spots the individual fuse that is displaying its glass bead. The fuse mounting is stenciled to indicate the equipment which that fuse controls. Therefore, the fusing system is also a *trouble locating device*. Within less than a minute after hearing the alarm bell, the attendant can reach the equipment that is in trouble and busy it out or turn it down. This reduces trouble reports. No subscriber is inconvenienced, except possibly the one who happened to be using the switch or the cord circuit at the time the trouble occurred.

Must be in Good Order

Obviously such a system must be kept in good order at all times. A practical test of the alarm circuit may be made by touching a probe, which is connected to 48 volts through a resistance, to each of the alarm bussbars. All relays in the circuit should be adjusted with a current flow test set. Special attention should be given to the "major alarm" fuses. These control circuits, if in trouble, affect the service of a large number of subscribers. All central office people should be thoroughly familiar with the "48-volt distribution system". This is often shown on a special circuit drawing.

One day, in a still quite new step-by-step office, the major alarm bell sounded, and the pilot lights indicated that the trouble was in a certain long row of fuses. However, no indicator was showing in that row. Much time was lost in finding the fuse. A visual inspection was first tried, then each fuse was tested with a test receiver. In the meantime the repair clerk began to receive many "Don't Ring" reports. While all this was going on, the big major alarm bell was clanging so loudly that it added to the confusion. (For obvious reasons the major alarm bell is never equipped with a shut-off key.)

Final Findings

The trouble lasted about 50 minutes and the final findings were:

(1) The fuse involved had suffered a rare accident. The alarm spring had

(Continued on page 50)

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made contact with the alarm buss but the indicator spring had caught on the mica portion of the fuse and, hence, the indicator bead was not displayed.

(2) *the fuse mounting was not stenciled* to indicate the circuit which it controlled.

(3) this fuse furnished 48-volt battery, through the ringing interrupter, to the ringing relays in one-third of the connectors. Thus, about one-third of the subscribers could not be rung.

(4) the central office force was not sufficiently familiar with circuits that could cause major trouble, and the circuit drawings were not properly filed.

(5) the operating company should have checked the fuse panels for stenciling before the installers left.

(6) the malfunctioning of the fuse was a freak case for which no one was to blame.

Backed by Main Fuse

These small indicating fuses are backed up by the big main discharge fuse. In a large office, there may also be intermediate fuses. The main fuse should very rarely operate. Most offices give many years of service between the time they are installed until the day the exchange is cut over to a new board without ever experiencing a blown main fuse. This is good because a blown main fuse means a total office failure.

To facilitate the replacement of a main fuse without delay, two fuses are often installed. They are mounted one above the other and are connected in series. There is also a large single pole double throw knife switch. In its upper position the switch shorts out the upper fuse. In its lower position the lower fuse is shorted. Thus, a new fuse is placed in the circuit by throwing a switch.

Operates Major Alarm

The main fuse should operate a major alarm. This is accomplished by bridging a small alarm fuse around the main fuse. If the main fuse blows the alarm fuse will quickly operate. This alarm circuit must operate on ringing current as the 48-volt power would be dead.

A severe storm, a big fire, or a flood, which causes heavy plant leakage, and which is followed by an extremely heavy traffic load, is the most likely cause of a blown main fuse. Some trouble may be experienced in replacing the fuse under these conditions. It may be necessary to first open all, or part, of the permanent lines. Some offices have an arrangement by which the battery may be cut off of all lines except "essential service" lines by operating one key. It may be necessary to do this.

When the fuse is replaced, the new fuse may blow at once. This may be caused by the initial surge caused by the capacitance of the outside plant. All of the cable pairs, and all of the station capacitors, must be charged by that first surge of current. A resistance of a few hundred ohms may first be bridged across the fuse mountings. This will charge the lines and the capacitors and, thus, the initial surge is avoided.

Extra Fuses on Hand

A supply of extra spare main fuses should always be on hand as several may be blown when attempting to replace one fuse. The fact that a blown main fuse is a very rare accident is all the more reason that the company should be prepared for it.

There are some circumstances in which the main fuse is purposely pulled. If the office is on fire and is about to be abandoned the main fuse should be pulled. The fire may not reach the equipment but it will be soaked with water. If the battery is off, there is a good chance of thoroughly drying the equipment and resuming service. However, if the battery is left on, electrolysis can completely ruin the equipment.

A flood that seems certain to cover the equipment is another reason for pulling the main fuse. In this case, there may be mud as well as water to contend with and recovery may take longer.

Night of Cut-Over

Then there is that last night. The office has been cut over to a new office in a new building. The ringing machine and the rectifiers are shut off, *the main fuse is pulled*, the lights are turned off, the doors are locked and the tired cut-over gang goes home to bed. (or perhaps to a big post-cutover party.)

The voltage of the ringing current varies from 90 to 150 volts depending on the ringing system in use. It may seem that this would be more likely to cause damage than the 48-volt dc supply. However, the ringing machine, unlike the central office battery, has a very limited current capacity. It may cause a few sparks, but there is little danger of a destructive arc. Excessive currents are controlled by resistance lamps. These lamps serve another very useful purpose. If a short or ground should occur in one connector or in one positon of a manual board, the whole office would suffer from very low ringing voltage. By feeding the ringing current through a resistance lamp at each connector or position, the low voltage is confined to the equipment involved.

Ordinary Bulbs Used

Some companies specify resistance lamps which are made for that purpose. Others permit the use of ordinary light bulbs of a specified wattage. If it is of the correct wattage, the lamp will remain dark or glow faintly in regular use, but will burn brightly on a short or ground. The lamp thus serves as a trouble indicator.

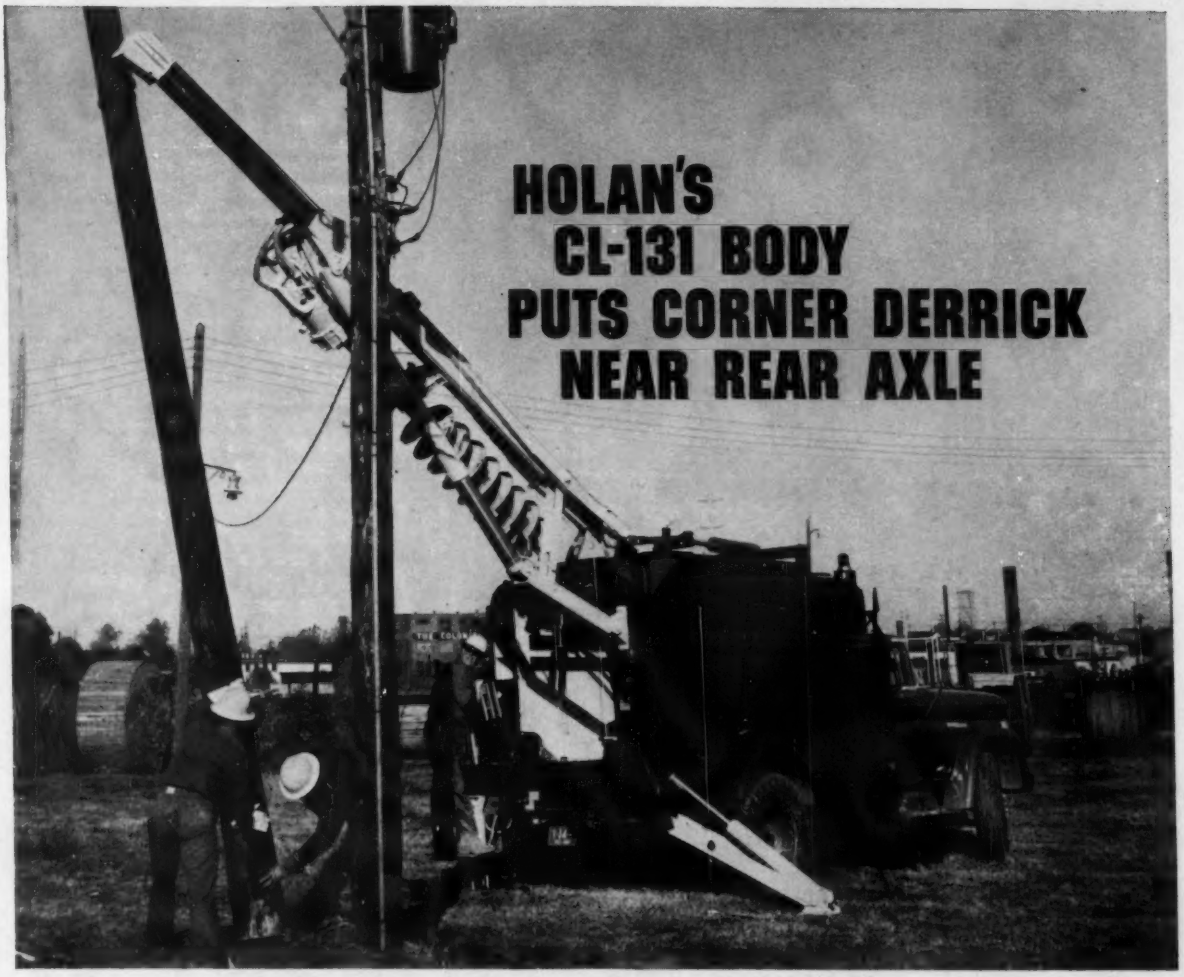
Failure of the ringing machine operates the "no ringing voltage" alarm circuit and sounds the major alarm bell. A high wound ac relay is bridged across the output of the machine and this relay is normally in the operated position. When it is released by a ringing voltage failure, a back contact operates the alarm circuit. If "automatic ringing machine transfer" is furnished, the same relay starts the spare machine and transfers the load to it. The alarm bell then stops ringing. If the regular machine is stopped by a power failure, other relays transfer the load back to the regular machine when the power is restored.

Effect of 110-120 Volts

The central office equipment is sometimes endangered by the 110-120-volt lighting circuit. We have seen some old manual boards with the 110-volt wires run in cleats inside of the board. They served the canopy lights which were located above the face of the board and also connected to outlets within the board for trouble lamp or soldering iron. Such wiring should be removed. If the operating room is properly lighted, canopy lights are not necessary.

Electric soldering irons often develop a cross between the winding and the metal outer shell in which the copper bit is inserted. The voltage thus introduced in the telephone circuits can do much damage and is also a fire hazard. The use of the electric soldering iron may be necessary when extensive work, such as the installation of new equipment or a big cut on the frame, is in progress; but for the daily routine work, other means can be used. Ordinary soldering coppers heated by gas plates installed in niches in the wall are very satisfactory.

Also there is a new type of electric



HOLAN'S CL-131 BODY PUTS CORNER DERRICK NEAR REAR AXLE

New Unit Mounts on 84" Chassis, Yet Stable Enough for Pole "Walking"

Holan's new CL-131 Body/7500 Corner Derrick Unit is a husky little heavyweight.

Short and compact, the body mounts on an 84" CA chassis — and the centerline of derrick rotation is less than 44" from the centerline of the rear axle. By "bobbing" off the rear, the center of gravity automatically shifts forward, making it possible to handle heavy derrick work with or without use of the hydraulic stabilizer jack.

In fact, long and hefty poles can be "walked" to position with the unit, set and aligned without use of pike poles.

And the compartmentation is ideal for light line construction or maintenance. On the right side, there are shelves with adjustable partitions, compartments for ropes and climber belts, a water cask, a thru box for long tools, a crosscut saw holder, and a rubber goods box in the superstructure that opens to the inside of the body.

On the left side, there is a horizontal compartment with drop doors and full-length shelf partitioned for miscellaneous equipment. And there's a left-hand lower box for heavy tools.

Here is a compact workhorse of a unit . . . one that will save time, maneuver easily and do a multitude of line construction and maintenance tasks. Call your Holan Field Representative . . . or write us today . . . for complete information.

"Walking" a pole is an easy task for Holan's CL-131/7500 Corner Derrick Unit which mounts on an 84" CA chassis.

Holan Corporation, 4100 West 150th Street, Cleveland 35, Ohio

Holan

Subsidiary of THE OHIO BRASS COMPANY

HOLAN

A ONE MAN INSTALLATION,

NEW! ACOUSTI-CALL

TELEPHONE BOOTH

3 EASY STEPS FOR ONE MAN INSTALLATION
1. Fasten pre-punched mounting bracket to wall.
2. Secure booth onto bracket.
3. Install telephone.

Easily located anywhere. May be multi-mounted. With this revenue building space-saver, you may accommodate high traffic areas, utilizing space as small as twenty-seven inches in width.

Easy to install because slotted, pre-punched bracket holes fit any studding. The booth is lifted only once when hung on the bracket. The telephone instrument is bolted directly through the booth onto the wall bracket, completing the installation. Requires only one installer and no special tools.

Invitingly fresh and clean, functional in color and compactness, ACOUSTI-CALL is available in blue, coral and green, ivory color interiors.

Write today for complete descriptive literature

MAIL COUPON TODAY!

ACOUSTICS DEVELOPMENT CORPORATION
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Department T-4

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Please send me FREE FOLDER all about ACOUSTI-CALL.

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Address_____

City_____ Zone____ State_____

iron that appears to be safe. It has a transformer in its handle that steps the 110 volts down to a low and safe voltage. This also increases the current. In place of a bit a little loop is used. This is actually a filament which is heated by the large current from the secondary of the transformer. The secondary circuit is not grounded, so there is no tendency for this current to seek ground. The filament heats in a few seconds when the trigger is pressed.

The ordinary 110-watt trouble lamp is dangerous when used in and around equipment. If used at all, it should have a non-metallic guard which is also fireproof. Even then, if the light is laid or hung in the wrong place, the heat may start a fire. Good flood lighting will make such lights unnecessary for most work. Each flood light should have its own switch so that it can be turned off and on as required, thus saving on the light bill. For certain jobs, where a light must be held closer to the work, we suggest the 48-volt trouble lamp. Some switch rooms have convenient outlets for 48-volt lamps and other tools and instruments that require 48 volts dc. Also an ordinary battery flash light may sometimes be used to advantage.

Switchboard Supervisor Honored for Saving Child

Mrs. Marion Ruge, switchboard supervisor at the Irving Park exchange of Illinois Bell Telephone Co., Chicago, has received the first "certificate of recognition" awarded by a Chicago Red Cross chapter. She is credited with saving the life of a Chicago child.

On March 2, 1962, Mrs. Duanne Berglund of Chicago dialed "Operator" and asked for help after finding her 2-year-old son unconscious.

The telephone operator, Mrs. Elsie Volltrauer, was told the baby had been found with a plastic bag covering his face. Mrs. Volltrauer summoned medical help while Mrs. Ruge talked to Mrs. Berglund and instructed her in mouth-to-mouth resuscitation.

Mrs. Berglund followed the switchboard supervisor's instructions and her son was breathing normally by the time an ambulance reached the home.

The award was presented at the Irving Park exchange. Danny and his parents attended the ceremony.

The award was initiated by the Red Cross and is given to persons who save lives by skills learned through information channels other than Red Cross courses.

Clear Choice

Wear a frown and have wrinkles; wear a smile and have friends.

THE ATTRACTO LIGHT

NOW IN USE IN OVER 32 STATES

IMPROVING THE APPEARANCE AND EFFECTIVENESS OF OUTDOOR PAY STATIONS

A large percentage of buyers of the Attracto Light have reordered. Several are using it on all their booths. Others are using it on all new installations.

The Attracto Light is inexpensive — cost less than $10.00. Easy to install, takes about 30 minutes. Trouble free and made to last for years. It does things for outdoor booths. Equip some or all of your booths and you will agree.

The Attracto Light is shipped complete, ready to install, — everything needed included. Choice of colors blue, green or red. Available for immediate shipment through all telephone equipment supply companies.

R-P CORPORATION ST. LOUIS, MISSOURI

Courts and Commissions

Pennsylvania Commission Tells Company to Reduce Rates

The Pennsylvania Public Utility Commission has directed the Bell Telephone Co. of Pennsylvania to reduce its exchange rates by 1.5 million dollars a year, starting June 1.

Effect of the commission's order will be even more far-reaching, however, according to a commission spokesman who told the press that the directive probably will block any request for a rate increase by the company for at least three years.

The rate reduction ended an unprecedented investigation of the company's current earnings during which the commission held 41 public hearings between Jan. 17 and Dec. 17, 1961.

The investigation was launched by the commission on its own motion, after the company's quarterly reports indicated its earnings might be over the line of what the commission regarded as a fair return.

After the company declined to lower its rates voluntarily, the hearings were conducted in Philadelphia, Harrisburg, and Pittsburgh. The entire case was reviewed by the full membership of the commission on Feb. 6. The order, which was just announced by Joseph Sharfsin, commission chairman, was unanimous.

On the basis of adjustments in the company's revenue and expenses by the commission, the company's net income would be approximately $56,280,000 a year.

During the test year ending June 30, 1961, the company actually claimed an income of over 57 million dollars. The commission's figure includes income of $6,274,000 from directory advertising, a source which the company claims should not be considered for rate-making purposes.

In directing the reductions in exchange rate—toll calls will not be affected—the commission discussed what it called "a range of reasonableness" of earnings.

The order said that the range is bounded at one end by "investor interest against confiscation . . . and threat of security to capital," and at the other end of "consumer interest against excessive and unreasonable charges for service."

The cities of Pittsburgh and Scranton had intervened in the case and presented evidence to show that the company's earnings were too high.

The Federation of Telephone Workers of Pennsylvania also intervened and urged that the commission order the company to see that employe salaries were not affected by any rate

(Continued on page 57)

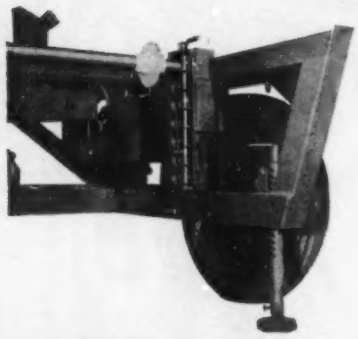
POLE AND STRAND DOLLY

HOGG & DAVIS MODEL H40BOT2

Built to meet the requirements of any utility engaged in Strand or Cable Reel transporting, and pole and material hauling, this unit, with **hydraulic lift,** makes it possible for one man to load or unload maximum sized reels.

FEATURES:

- ★ 4000 lbs. capacity
- ★ Reel capacity 20" to 50" dia., 44" wide
- ★ Rear bolster not required when transporting reels, and can be locked in bracket provided.
- ★ Idler wheel full 360° swivel; Timken mounted; hydraulic operated; fast spring return.
- ★ Can be equipped with any type wheel brakes.
- ★ Four wheel chocks
- ★ Priced within the smaller budget. Versatile to fit all needs.
- ★ Full hydraulic lifts
- ★ Free access to reel
- ★ Mechanical quick release rear stands
- ★ Self-locking bolster chocks with cable for each bolster



HOGG and DAVIS Inc.

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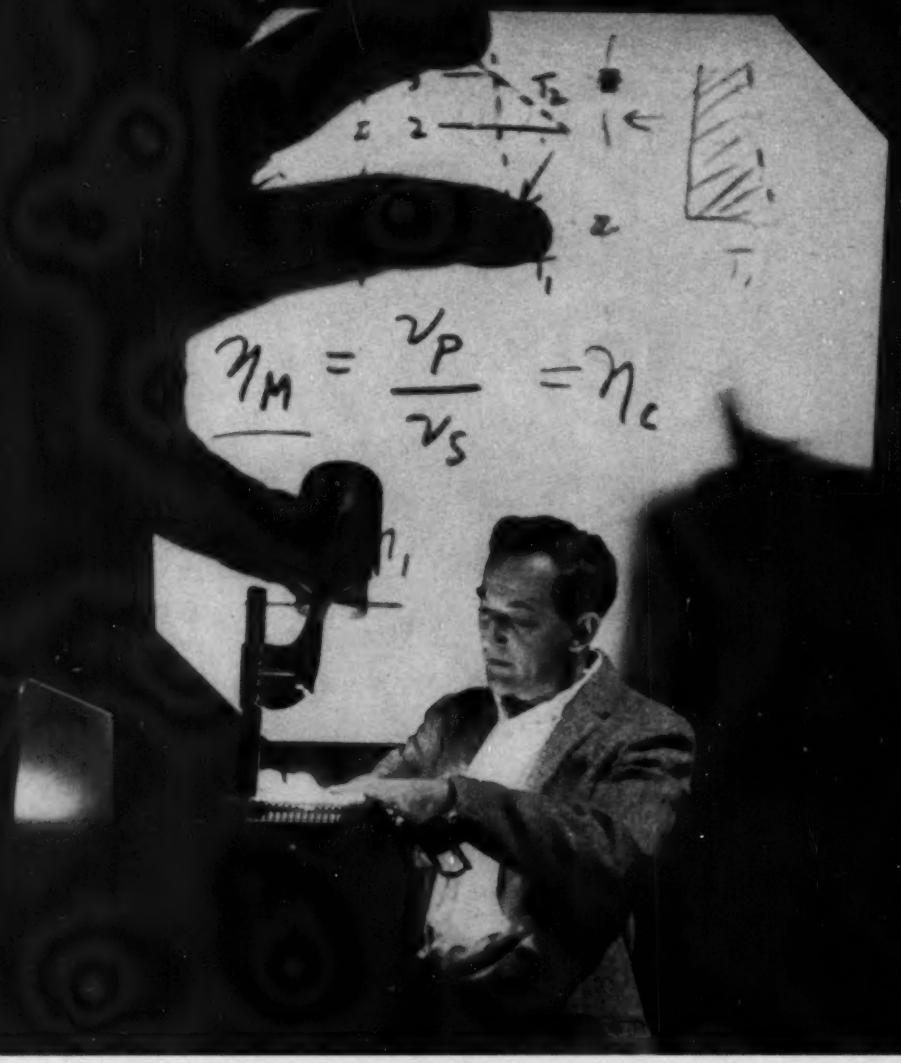
What sets the stage for scientific discovery?



H. E. D. Scovil, pioneer developer of the solid state microwave maser, explains a point at a symposium at Bell Telephone Laboratories.

There is no one answer. But surely discovery is more likely when people are stimulated to think in new ways. And nothing more powerfully stimulates scientists and engineers than up-to-the-minute discussion of the latest developments.

Bell Laboratories scientists and engineers make a point of exchanging information on their latest advances not only among themselves but with the great world-wide professional community to which they belong. Last year, for example, Bell Laboratories specialists delivered over 1200 talks to technical societies and universities. The stimulating exchange of new ideas plays an indispensable role at the world center of communications research and development.

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TRADEMARK
GUY & MESSENGER
PRODUCTS
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Look closely — you'll find them on countless thousands of miles of communication lines. PREFORMED attachments are silently dependable . . . securely guying poles, suspending messenger, splicing, protecting. You hardly notice them because they work so well. And that's why it pays to take notice. Always specify PREFORMED and be certain of work well done.
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decrease. On that score, the commission declared:

"We find no legislative intent or judicial interpretation of the public utility law which would permit this commission to assume a wage-fixing role or inject itself into a bargaining procedure between regulated utilities and their employes."

N. C. Telephone Co. to Buy Laurel Hill Telephone Co.

North Carolina Telephone Co. was authorized by the N. C. State Utilities Commission Apr. 9 to purchase the stock of Laurel Hill Telephone Co. which provides service in Scotland County and also to sell additional shares of its own stock to raise funds for a complete revision of the Laurel Hill system.

Under the order, North Carolina Telephone will give Laurel Hill stockholders 120,000 shares of stock, valued at $1.25 a share, in exchange for Laurel Hill stock. The North Carolina company also will sell 250,000 shares of stock to General Telephone and Electronics Corp., and 4,416 shares to private individuals at $1.25 a share to provide money for revising the Laurel Hill system, which now has 400 subscribers and 200 requests for new or improved service.

Commission Chairman Harry Wescott said present rates of Laurel Hill will not be affected by the merger, but that he expects North Carolina Telephone to ask for an increase in the Laurel Hill rates in the immediate future to justify the expenditures for improved service.

Asks to Borrow Money

The Berryville Telephone Co. has asked the Arkansas Public Service Commission for permission to borrow $50,000 from the Kellogg Credit Corp. to finance expansion. The money is to be used to install more automatic switching equipment at Berryville, buy a new automatic switchboard for the Oak Grove exchange and build rural lines.

Plant Employes to Vote On Union Representation

The National Labor Relations Board has directed the Carolina Telephone and Telegraph Co., Tarboro, N. C., to hold an election among its plant employes to determine whether they wish to be represented by the Communications Workers of America, AFL-CIO. The date of the election has not been set.

The company contended all eligible company employes in all departments should have an opportunity to vote in the election. The board, however, ruled that the election shall be limited to eligible employes in the plant department.

Authorize Minnesota Sale

The Minnesota Railroad and Warehouse Commission on Apr. 16 authorized the sale of the Watertown Telephone Co. to the Westonka Telephone Co., Hector. The Watertown company serves approximately 5,043 stations.

Reopen Cal. Investigation of CW&T, PT&T Services Rates

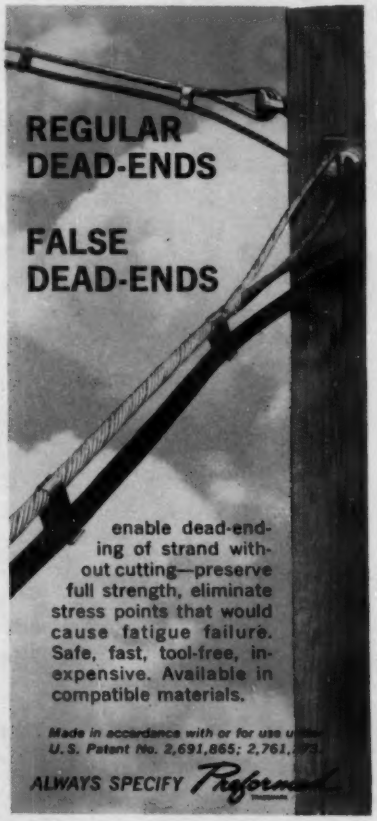
The California Public Utilities Commission on Apr. 23-25, reopened hearings on its investigation into telephone rates and services in San Gabriel Valley exchanges (TELEPHONY, Nov. 4, 1961).

Complaints were filed last year against the California Water & Tele-

(Continued on page 60)

AT THE TOP
AT THE BREAKER
AT THE ANCHOR
GUY-GRIP
DEAD-ENDS
offered for all sizes of guy and messenger strands—available in compatible materials; hold 100% of the R.B.S. of the strand; recognized as the safest, most satisfactory dead-ending device.
Made in accordance with or for use under U. S. Patent No. 2,691,865; 2,761,273.
ALWAYS SPECIFY Preformed

STRAND SPLICES
join new strand or restore full mechanical strength to damaged or severed strand without cutting; permit spinner to ride over smoothly without adjustment; will flex with strand; safe, tool-free, quick and economical, with visible inspection. Available in materials completely compatible with the strand.
Made in accordance with or for use under U.S. Patent No. 2,691,865; other patent pending.
ALWAYS SPECIFY Preformed


REGULAR DEAD-ENDS
FALSE DEAD-ENDS
enable dead-ending of strand without cutting—preserve full strength, eliminate stress points that would cause fatigue failure. Safe, fast, tool-free, inexpensive. Available in compatible materials.
Made in accordance with or for use u
U. S. Patent No. 2,691,865; 2,761,
ALWAYS SPECIFY Preformed

AE provides business communications for large or small subscribers!

Let's take a look at two completely different commercial customers in your area. The corner drug store has two logical spots for a telephone—the prescription desk and the fountain. Often, the pharmacist wants to exclude the soda jerk from his conversation. For this small pharmacy, our Type 85-C phone is ideal...

The industrial plant, on the other hand, needs a complete communications system to handle a large volume of incoming, outgoing and internal traffic. This factory needs a PABX system with many auxiliary services. AE gives you stock delivery on six PABX boards.

For details on our complete line of business phones, PABX and PBX boards and key systems, see your AE representative. He can also furnish you with valuable sales aids to help you promote business communications equipment. To contact him, just write Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC

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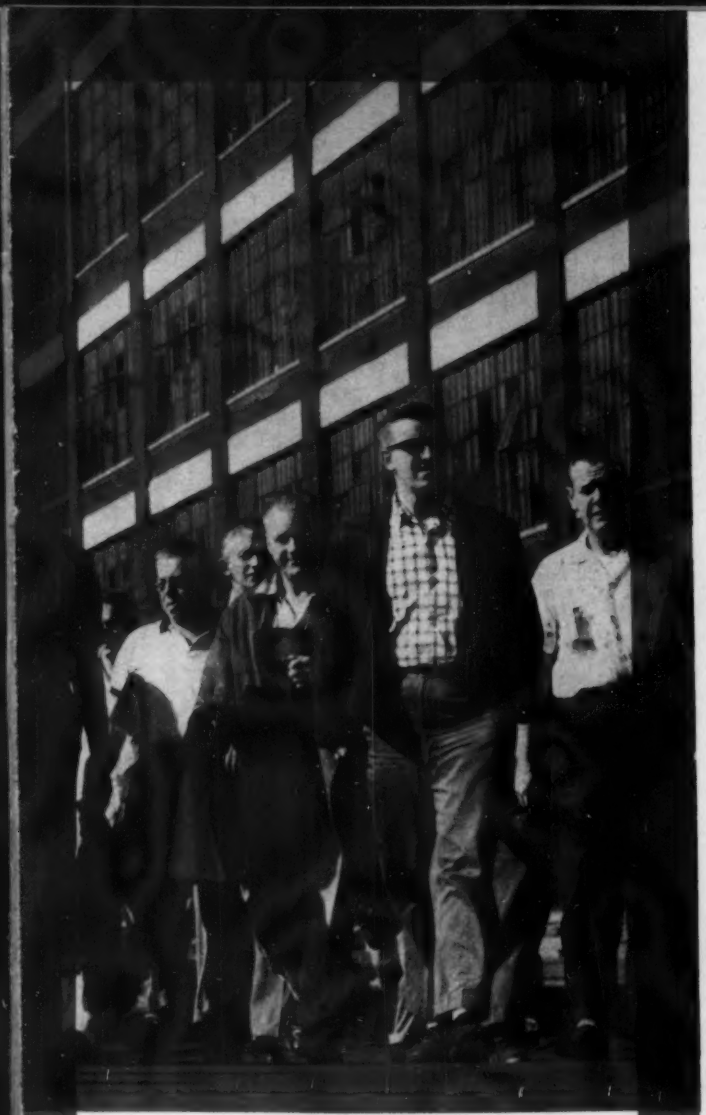
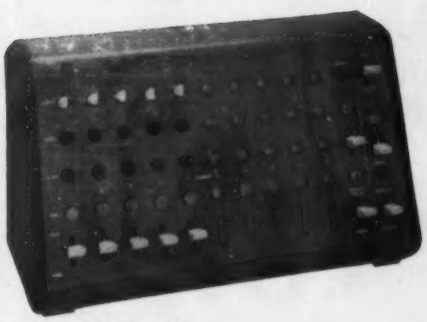
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM





TYPE 75 PABX A complete communications system. Designed to serve up to 200 lines. Can be expanded for greater capacity. Desk-type attendant cabinet (shown here) or floor-type attendant cabinet.

TYPE 85-C PHONE For two-line pickup, signaling and extension exclusion. Ideal for retail store, receptionist or small office. Simple turn button switches from one line to another. Choice of colors.

phone Co., Monrovia, by subscribers in the Monrovia-Duarte-Arcadia area, and by members of the Hastings Ranch Telephone Improvement Association, the city of Sierra Madre, and a number of commercial customers. At the same time, complaints were filed against the Pacific Telephone & Telegraph Co.

In reopening the hearings to admit further evidence, the commission was looking into service, rates, exchange boundaries, billing practices, charges, and local calling areas for extended service subscribers.

Grant Permission for Sale Of Canadian Company

The Ontario Telephone Service Commission has granted approval for the sale of the Ayton Telephone Co. to the Wightman Telephone Co. of Clifford.

The sale, to be completed before the end of 1962, will permit conversion of the Ayton company to dial.

Continental Telephone to Offer 475,000 Shares of Common

Continental Telephone Co., St. Louis, registered 475,000 shares of common stock with the Securities and Exchange Commission, to be offered through underwriters headed by Allen & Co. and E. F. Hutton & Co.

Since its organization in 1960, the company has acquired controlling interest in 33 operating telephone properties serving approximately 71,000 telephones in California, Illinois and 10 other states, and has acquired all of the stock of Central Western Co., a telephone service corporation, and of Medusa Equipment Corp., an equipment leasing company.

Asks Telephone Rate Increase

A five to 22 per cent telephone rate increase is being sought by the AuGres (Mich.) Telephone Co., according to Mrs. Catherine Maser, president, who said an application for the rate increase has been sent to the Michigan Public Service Commission.

Minnesota Companies Get Okay for Sale

The Minnesota Railroad and Warehouse Commission has granted the Clara City Telephone Exchange Co., permission to buy the Havelock Telephone Co., Maynard. (TELEPHONY July 1, 1961)

On June 19, 1961, the commission denied authority for the sale.

The commission order was then appealed to a district court which reversed the commission's decision.

The district court's decision was appealed to the state supreme court, which refused to reverse the district court decision and dismissed the case.

Hear Rate Request Affecting Three Indiana Companies

The Indiana Public Service Commission on Apr. 25 was to hear the rate request of the Camden Telephone Co. At that time, a petition by the Deer Creek Cooperative Telephone Co. and the Burrows Telephone Co. for permission to sell to the Camden Telephone Co. was also before the commission (TELEPHONY, Feb. 24).

If the Indiana commission grants the Camden company a raise, according to a request filed on Apr. 3 by Camden, the increase will also affect the rates of the companies wishing to sell, and become effective at the time Deer Creek and Burrows are cut over.

Michigan Company Sells To Independent Tel. Corp.

Port Hope Telephone Co. recently concluded arrangements for sale of its property to Independent Telephone Corp. of Michigan, a subsidiary of Independent Telephone Corp., New York (TELEPHONY, Jan. 27).

All stockholders of the Port Hope Telephone Co. will receive two shares of $10 par value 4 per cent preferred stock and one share of common stock of Independent Telephone Corp., N. Y., for each share of Port Hope company common stock.

Approve Minn. Sale Transfer

The Minnesota Railroad & Warehouse Commission on Apr. 9, in the matter of the joint application of the Mazeppa Telephone Co. to sell, and of the Mazeppa Telephone Co., Inc. to purchase, granted the seller, Walter F. Tri, permission to convey and transfer the property; and the Walter F. Tri's, original purchasers, to operate it under the name of the Mazeppa Telephone Co., Inc. The Mazeppa company serves approximately 373 stations.

Cooperative Granted Charter

The Laverne Valley Telephone Cooperative, Laverne, Okla., has been granted a charter. Incorporators are listed as Ralph Baker, Olen Zoldoske, and Charles Johnson, all of Laverne. Capital stock is listed as $1,000. (The company does not serve the Laverne area.)

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Cleaning Cloths* AND SWEEPING TOOL

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IN ANOTHER MINUTE....

THAT'S THE SPEED OF A CORNER-MOUNT "Pole-Master" HYDRAULIC DERRICK

A minimum crew can dig holes and set poles in record time without blocking traffic or jockeying the truck into position. That's the public-pleasing, time-saving beauty of the Series PM-30 Pole-Master Derrick.

From a parallel parked truck the PM-30 "live booms" 4 tons and with its hydraulic head sheave extension stretches out to dig* holes and set poles across gullies and fences. It mounts on either rear corner of any style body for wide-open operation to the back or either side.

Choose from 3 different sizes for 40', 55' and 70' poles. All include such safety and convenience features as underfloor winch line, electrically isolated operator's platform and mechanism to lock the load in event of accidental damage.

When can a Corner-Mount "Pole-Master" Derrick start saving you time and money? Write today for more details.

*Series DF-1 "Earth-Master" Digger digs holes up to 24" in diameter and 10' 6" in depth.

POWERS American

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A POLE WILL BE HERE

What does CF&I Galvanized Strand have in common with ducks?

They both shed water, of course. Mother Nature figured out how to do it for ducks... CF&I figured out the answer for Galvanized Steel Strand. A built-in zinc coating literally shrugs off moisture to provide a weather-resistant, long-lasting steel strand that really does something about the weather.

For telephone messenger wire or guy wire applications, you'll find CF&I Galvanized Steel Strand ideally suited for the task at hand. It is available in seven- or three-wire constructions in accordance with ASTM specification A-122. Or it can be tailor-made to meet your own specific requirements.

Available nationwide from a network of warehouses, Galvanized Steel Strand, like all CF&I products, is manufactured to meet highest American standards. For immediate delivery, contact your nearby CF&I sales office.

8491-A

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices In Key Cities

Three Installers Honored For Saving Children

Mountain States Telephone & Telegraph Co. has awarded certificates to three of its Phoenix, Ariz., telephone installers for mouth-to-mouth resuscitation of children who had fallen into water.

Recipients were Michael E. Alvey, Milford Cluff, and Joseph F. Nelson.

Alvey is credited with saving the life of the grandson of a Phoenix businessman after the child had been found drowning in the family swimming pool. In a letter to the telephone company, the businessman praised Alvey for his quick response and long efforts to revive the boy.

Cluff used the mouth-to-mouth method to save the life of a neighbor's 2-year-old child who had fallen into an irrigation ditch.

Nelson used the same method on an 18-month-old girl who fell into an irrigation ditch while Nelson was working on a telephone line nearby.

Joint-Use Contracts

Continued from page 36

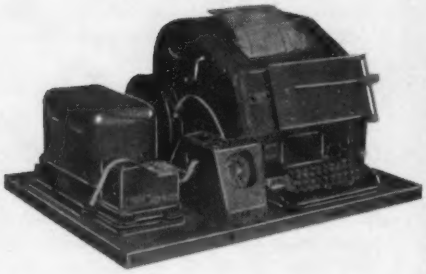
In the period 1910 to 1924, quite a few joint-use contracts were negotiated, all of which had certain rough spots and points of contention, e.g., rates, voltage limitation clause, construction specifications, liability clause, etc.

Paramount of these obstacles, was the voltage limitation clause, which limited joint use to a maximum of 5,000 volts. Up to this time, the standard primary distribution voltage used by most power companies was 4,100 volts between phases, and 2,300 volts phase to neutral or ground. A power line failure in a joint-use section, upon contacting the telephone plant, subjected the telephone facilities to 2,300 volts, which was within the operating range of telephone protective equipment.

Resulted From Explorations

The so-called "Voltage Limitation Clause" evolved from a series of explorations in the matter of electrical protection for telephone apparatus and lines by the American Telephone & Telegraph Co. in the period of 1905-1912, and, oddly enough, the protection was aimed at situations where power and telephone lines crossed each other and not specifically for joint-use.

By now, the power companies were aware of the situation that would soon find higher primary voltages a necessity to meet ever expanding loads, and were becoming more reluctant to



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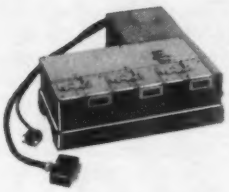

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TELETYPE EQUIPMENT

- LOWEST PRICES! • EXCELLENT — LIKE NEW!

A SPECIAL SERVICE: We repair, overhaul and recondition like new your present equipment

DATACOM EQUIPMENT FOR CONVERSION TO DIAL TWX

- Machines supplied with Data Equipment attached.
- Data Set Conversion Units AE691A & AE101A available with complete installation instructions.
- Factory service for overhaul and modification of present equipment to dial operation.

NOW AVAILABLE . . . telegraph printers, including TELETYPE model 14, model 15, model 19 plus typing reperforators, transmitter distributors, multiple message transmitter distributors, FRXD and parts for many makes and models.

We can offer this equipment at extremely favorable prices, making it possible to expand communications facilities with a much smaller investment.

Our staff of teletype technicians is thoroughly capable and experienced in modifying this equipment to your specifications.

Our machines are adaptable for TELEX & TWX operation.

All models are available in standard colors to match your decor.

We maintain a large inventory of replacement parts for all types of teletype equipment.

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You can cut costs for ditching and laying cable to 1½¢ per foot*

Here's how...

First, get yourself a Parsons® 77 Trenchliner®... You can easily get up to 21 lineal feet of trench per minute. You can work anywhere because the 77 is not much wider than a yardstick. With 32 hi-lo digging selections, any kind of ground is a cinch. The ladder-type boom digs to 5' depths, 6" to 18" wide. Starts cut fast. Holds accurate grade. Handles vertical set-in work and undercutting with ease.

Second, add a special cable laying device... Designed for the fast action of the 77. Equipped with rubber wheeled cable feeder to give absolute protection. Cable is laid automatically without a pause or problem.

**The cable installation department of a major telephone company gives the 77 Trenchliner credit for reducing their cable laying costs from 5 to 9 cents per foot down to a low, low 1½¢ per foot.*

PARSONS COMPANY
A Division of Koehring Company
NEWTON, IOWA

Rush full data on the 77 Trenchliner

Name _____

Company _____

Address _____

City _____ State _____

TEL-P203

sign any new joint-use contracts containing a voltage limitation clause.

Joint General Committee

The first concerted effort by the power and telephone industries, to boil down these differences was made by the formation of a committee to study the problems of joint construction and contracts. This committee, known as the Joint General Committee, was formed early in 1921, and was composed of representatives of the National Electric Right Association (an association of private power interests organized about 1885) and the Bell Telephone System.

The first report of this Joint General Committee entitled, "Principles and Practices for the Joint-Use of Wood Poles by Supply and Communications Companies", was issued on Feb. 15, 1926, and marked the first recognized effort to standardize the thinking and general pattern for the practice of joint-use and the supporting contracts.

This report made recommendations covering the principles and practices that formed a mutually satisfactory basis for contracts between the supply and communication companies in the matter of joint-use of wood poles. The report also recommended that agreements then in use be modified to comply with these principles and practices. This report also provided a means of softening the impact of the controversial voltage limitation clause.

Provided for Procedure

Under Paragraph 6 of this report it provided for a procedure, when the character of the circuits is changed, i.e., if joint-use cannot be continued under the new circuit conditions, then the parties shall cooperate to determine the most practical and economical method of effectively providing for separate lines, Also, that the net cost of relocating either the power or telephone circuits would be equitably apportioned, consistent with the general terms of the particular contract involved. It was further set out by both power and telephone companies under appropriate Appendices 1 and 2, respectively, of the subject report that:

Power company (Appendix 1) is willing to enter into joint-use, with the understanding that higher operating voltages are not prohibited.

Telephone company (Appendix 2), while not discarding the character limitations of the power circuits, recognizes that there will be situations where the costs and conditions of separate lines would be prohibitive. Therefore, they are will-

ing to enter into joint-use, irrespective of the character of the circuits involved, with the understanding that both parties will cooperate in determining that joint-use is the best engineering solution, and that acceptable arrangements can be effected to meet adequately the telephone service requirements.

Cable Strand Grounding

Under such a decision, the telephone protection aspects include closely coordinated arrangement of special grounding of the telephone cable strand and bonding the strand sheath and/or shielding to the power line neutral, along with other grounding features so as to minimize the contact or entrance impedance of a power line contact with the telephone plant; also, utilization of high speed de-energizing equipment on the power circuits. This de-energizing time should be around three to five cycles, or something less than 0.1 second. These fast-acting switchgears are also important to the power companies, since they interrupt faults or failures before extensive line burning and/or conductor annealing can take place.

In such joint-use situations there is another factor that provides added protection. Because of the importance of this type of power circuit, the power company is extremely interested in avoiding any physical failures, which interrupt service to a large number of customers and may include very important services, thus the class of construction employed for such circuits provides for the highest factor of safety and reliability consistent with appropriate cost limitations.

1926 Report Reissued

In 1933, the National Electric Light Association was absorbed by the Edison Electric Institute (EEI), at which time the 1926 report was reissued without change by the Joint General Committee of EEI, and the Bell System, and is the current basis for negotiating joint-use contracts.

Also, on Oct. 29, 1945, the specification recommendations of the Joint Committee on Plant Coordination of the EEI and Bell System were revised on the basis of Part Two of the Fifth Edition of the National Electrical Safety Code. This publication is known as EEI Publication No. M12, dated October 1945, which replaces EEI Publication No. E3, dated January 1937. (EEI Publication No. M12 can be obtained by non-member companies and by Independent telephone companies from EEI or Graybar Electric Co., at a nominal fee.)

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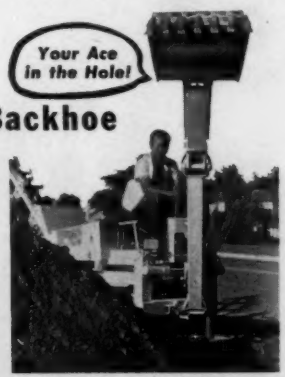

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Because of the wide variety of possible conditions, Publication No. M12 is not a complete specification, but will serve as a general guide, along with Part 2 of the Fifth Edition of the National Electrical Code, or subsequent editions thereof (the Sixth Edition of NESC has just recently been issued), for establishing minimum requirements for circuit spacing and clearances, and strength of construction for safety to the public, employes, plant and private property.

Other Joint-Use Types

Publication No. M12 also recognizes that, because of developments of the art, other satisfactory types of joint construction may be developed, the employment of which should not be precluded, consistent with the full agreement of the parties of a given contract, as being safe and satisfactory.

It is believed that the foregoing presents a brief picture of the evolution and development of the basic conditions involved in the matter of acceptable and workable joint-use arrangements. Now for a brief rundown of the different types of contracts, and their relative merits.

Contract Types Described

As mentioned earlier, there are several types of contracts that have been employed over the past 50 or 60 years. For a quick comparison we have:

(1) Contact Rental Contract or Facility License. This type of contract is usually of a miscellaneous nature, normally employed to cover special conditions, or where reciprocal rights are not generally applicable, e.g., spasmodic joint-use, brought on by difficult right-of-way or special service conditions. Not generally recommended as a satisfactory joint-use arrangement, it entails complicated bookkeeping because of the variation in rates for the different types of contacts and requires periodical inventories of such contacts, which is costly.

(2) Permanent Rights Contract. The permanent rights type of contract involves more or less fixed conditions and is of a reciprocal nature. It is somewhat related to the joint ownership situation, except that in lieu of purchasing an ownership of the pole, purchase of a permanent right for contact is effected and the ownership of the poles remains unchanged. Arrangements for maintenance, rearrangements and transfers are the same as under the joint ownership contract.

(3) Maintenance Contract. Under this type of contract, reciprocal rights are granted with the understanding that

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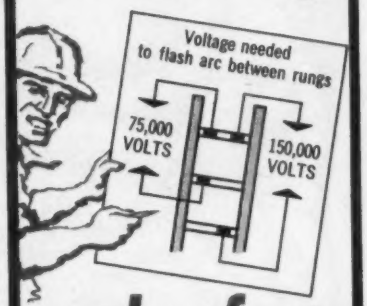

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all maintenance, (e.g., pole rearrangements, changes and/or replacements, and labor) is handled on a 50-50 basis, and the number of jointly-used poles should be in balance. This contract is not desirable, since it is difficult to administer because of costly bookkeeping and billing complications.

In regard to the latter, each time a pole is changed or relocated, the labor must be on a "keepcost" basis, and a bill for 50 per cent rendered to the licensee, which in turn involves appropriate adjustments and/or credits to the owner's maintenance account. This contract is not generally recommended.

(4) Joint Ownership Contract. This type of contract involves joint ownership of all jointly used poles, i.e., each party owns a proportionate interest in each joint pole. The "joint pole" here is based on a fixed size, normally considered adequate for both power and telephone facilities. When one or the other company requires a pole higher than the fixed or normal joint pole, such company pays the difference and takes title thereof in proportion to its investment therein.

This divided ownership is predicated on the theory that each company will own the same number of joint poles, even though the percentage of ownership will vary from 50-50 for the normal pole, to whatever percentage is derived from a larger-than-normal pole, as set out above.

Similarly, all costs of replacing and/or relocating such joint poles will be borne in the same proportion as the aforesaid ownership. The responsibility for doing the above described work must be divided in accordance with a custodianship of the joint poles, mutually agreed to by both parties, who will also be responsible for billing the other party.

Some of the outstanding objections to the Joint Ownership type of contract are the tax complications and the legal aspect of mixed or proportionate title to the property, especially in the event of mortgages, sales, mergers, or consolidations entered into by either party.

Maintenance of accurate records and associated bookkeeping represent a very costly item. In this writer's opinion, this type of contract is not particularly recommended.

(5) Space Rental Contract. The Space Rental Contract is also known as the "Flat Rental Per Pole Contract," and is used more than any other type. This contract is the simplest and most sensible to administer. The title of all joint poles remains vested in the owner, who provides space for the other company, generally on the basis of a 35-foot pole, with the rental derived theoretically as a function of

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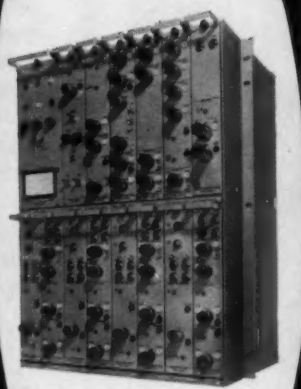

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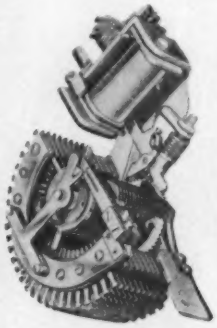

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the space utilization ratio of the power and telephone companies, as applied to the annual charge of the standard 35-foot joint pole.

All pole maintenance and/or replacements are made by the owner, with the facility rearrangements and transfers being made by the respective owners thereof. Like other types of joint use contracts, here, again, the ideal arrangement would be where each party owned one-half the jointly-used poles, in which case there would be no payments by either party —the obligations would balance out.

While the equal division of ownership is the basic objective, an unbalanced ownership within reasonable limits, which usually moves in favor of the power company, is not really serious, since the rates, if properly established, can encourage an equitable distribution of the financial responsibility.

In the case of a pole higher than the normal joint pole;

(a) If required by the owner, he would bear the cost thereof.

(b) If required by the licensee, he would bear the excess cost over that of a standard or normal joint pole.

Minimum of Bookkeeping

This type of contract requires a minimum amount of bookkeeping and billing, and is strongly recommended, particularly for the larger companies, but is equally adaptable for smaller companies.

There are more logical reasons today why joint-use of power supply and communications companies should be seriously considered. Separate lines, in addition to creating a "forest of poles," (See Fig. 3), would result in a variety of conflicts, up to and including the worst possible condition—the overbuild. The overbuild is joint-use of the right-of-way only.

Standardized joint-use is a sensible approach to the problem of serving the community with these essential services. It promotes good public relations, especially in the residential areas; good relations between power and telephone companies, and high standards of safety and economy, providing the contractual arrangements adequately consider the over-all economic aspects.

Study of Rental Rates

Joint-use of wood poles by power supply and communications companies, in addition to correcting and/or creating better physical conditions, should be productive of some savings to both companies through the reduction of

plant duplication, with subsequent reductions in capitol expenditures and fixed charges. We are all interested in protecting and improving our earnings, which obviously includes finding more efficient operating procedures. This is a basic function of good management.

To begin with, we are dealing with a basic inequity of investment requirements, since the telephone company normally requires a 25-foot pole costing about $35, whereas the power company's normal requirement is a 35-foot pole costing about $75.

Experience has shown that the 35-foot pole is normally capable of carrying both supply and communications facilities, and has been established as a normal or standard size for joint use. Thus, the power company, without any change in pole size, can support the telephone facilities in a joint-use arrangement, which brings us to the question of what the rental charge for such contact should be.

Equitable Apportionment

The most sensible base for this rental charge is an equitable apportionment of the average annual charge for the 35-foot pole. Using an annual charge figure of 13 per cent, the telephone company having its own or separate line and using 25-foot poles would have an annual charge of $25 x .13 = $9.75. The rental rate would then be carved out of the $9.75, somewhat in relation to the space requirements and/or occupancy of both companies.

It is here that we encounter the rental rate difficulties. In some cases, the power company contends that the rate should be on a 50-50 basis, i.e., each company would pay one-half of the joint-pole (35-foot) annual charge. Thus, the telephone company would pay, $9.75 x .50 = $4.875 or $0.33 more than their separate line charge of $4.55.

The power company, on the other hand, absorbs 50 per cent of $9.75 or 4.875, one-half of the fixed charge normally incurred for the separate line. Thus, the power company saves $4.875 in the joint-use arrangement over the separate line costs, while the telephone company pays a premium of $0.33 for the privilege for sharing the joint pole.

Rate Comparisons Shown

It is obvious that the 50-50 ratio holds no attraction for the telephone company. It is more economical to carry its own pole line.

As a matter of comparison, arbitrary variations of the space or occu-

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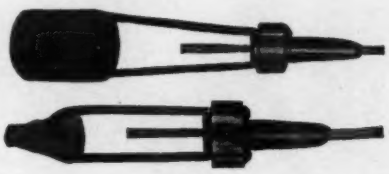

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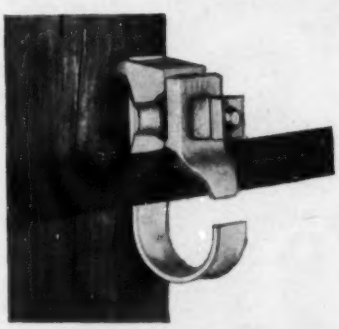

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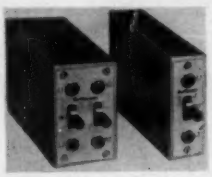

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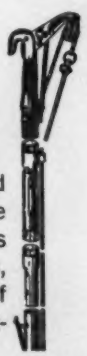

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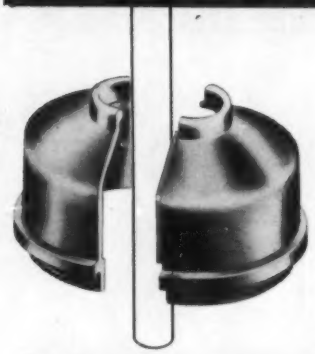

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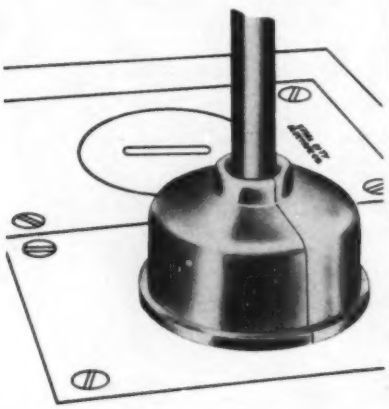

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pancy rations for rate-making purposes are shown in the table below.

The joint-use rental rates are based on the normal or standard 35-foot class 5 pole, and the savings are applied to the separate line costs where the telephone company uses 25-foot Class 7 poles ($35 in place) with 13 per cent annual charge (or $4.55) and where the power company uses 35-foot Class 5 poles ($75 in place) with 13 per cent annual charge of $9.75.

	Space Rental Rate		*Savings Over Separate Lines*			
			In Dollars		*Expressed as Percent*	
Ratio	*Telephone Company*	*Power Company*	*(AC = 4.55) Tel. Co.*	*(AC = 9.75) Power Co.*	*Tel Co.*	*Power Co.*
50-50	$4.875	$4.875	$—0.33	$4.875	— 7.3%	50%
45-55	4.39	5.36	0.16	4.39	3.5%	45%
40-60	3.90	5.85	0.65	3.90	14.3%	40%
35-65	3.41	6.34	1.14	3.41	25.1%	35%
30-70	2.93	6.82	1.62	2.93	35.6%	30%

Note: The above costs and annual charge figures were arbitrarily chosen for this study. However, it is believed that they are sufficiently in relation to actual conditions to present a fairly accurate picture of what we are trying to see. Also, while these figures imply the condition where the telephone company is occupying the power company-owned joint pole, they are similarily applicable in cases where the telephone company owns the joint pole.

Point of No Return

As a means of showing more realistically the relative advantages of the telephone and power companies under joint use, the last two columns of the above table present the respective savings in terms of per cent, which indicates clearly the telephone company's point of "no return".

Taking an actual case of space requirement or utilization, let us refer to *Fig. 4*, where approximate dimensions have been added.

The power company is actually using 7 feet and the telephone company 2 feet with 4 feet clearance. This is a total of 13 feet for the joint occupancy. By sharing the 4-foot clearance equally, the power company requirement is 9 feet or 9/13 of the active space and the telephone company's requirement is 4 feet or 4/13 of the active space.

If the respective space rental rates are derived from these figures, we get the results shown in the following table:

	Applicable Ratio	*Rental Ratio*	*Savings Dollars*	*Percent*
Telephone Company	4/13 = 30.8	$3.00	4.55 — 3.00 = 1.55	1.55/4.55 = 34.2
Power Company	9/13 = 69.2	$6.75	9.75 — 6.75 = 3.00	3.00/9.75 = 30.8

Point of Bargaining

This is closely approaching the 30-70 ratio, which would no doubt bring objections from the power people, and here is where the rate negotiations begin.

From this analysis it is obvious that the telephone company's space rental rate should adhere somewhat closely to the actual space requirements, tempered by a reasonable savings, which becomes the point of bargaining.

It is realized, of course, that the owner of the joint space is burdened with the investment and, perhaps, should be favored somewhat in the savings treatment. This is a reciprocal matter and accrues to the benefit of the owner of the pole. However, the telephone company should be able to show a savings of at least $1.25 per pole to justify the associated administrative task, together with an economic margin over the separate line costs.

Using the separate line annual charge of $4.55, a savings of $1.25 would indicate a telephone rate of $4.55—$1.25 or $3.30 and a per cent savings of $1.25—$4.55 or 27.4 per cent. This line of reasoning would produce the power company rate of $9.75—$3.30 or $6.45, and a per cent savings of $3.30—$9.75 or 33.8 per cent. This works out to a ratio of 3.38—6.62, and somewhat in the area of an equitable division of the joint-use costs.

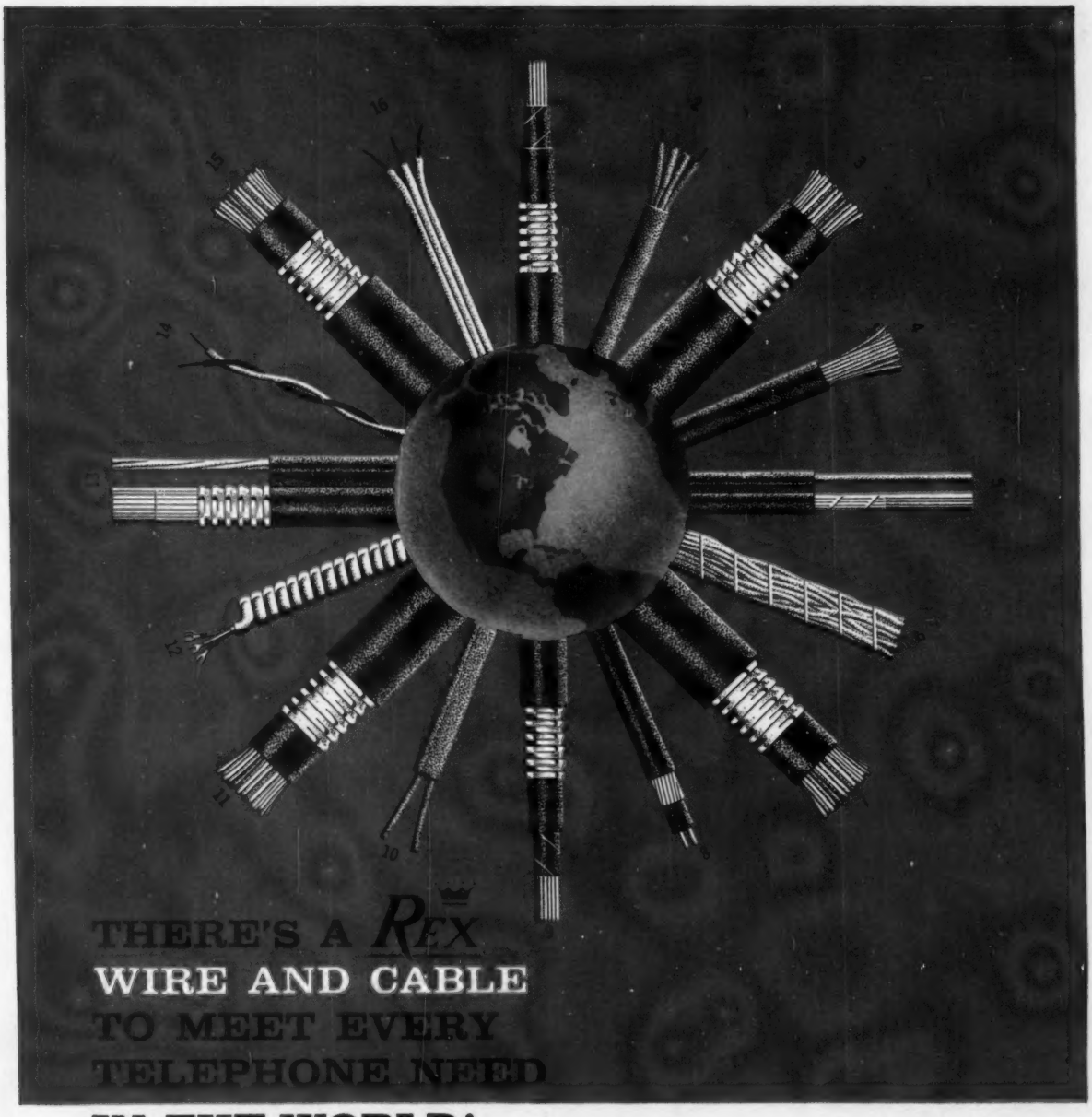
Incentives Must Be Present

Perhaps our approach in this rate problem has been wrong. Instead of starting out with the occupancy ratio, why not tackle the problem from the savings angle along the lines of the preceding paragraph and work back to the space requirements, in the hope that an acceptable compromise can be reached?

There is no question as to the economic potentialities of joint-use, but the apportionment of costs must be such as to provide enthusiastic incentive on the part of both parties, if full realization is to be achieved.

As for the investment responsibility related to the ownership of joint poles, as mentioned earlier, properly constituted rates will serve as an incen-

(Continued on page 74)



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3	ADCP	Aerial Exchange Cable	REA-PE-22
4	D	Inside Wiring Cable	—
5	8RDW	Figure 8 Rural Distribution Wire	—
6	RDW	Rural Distribution Wire	REA-PE-15
7	ADCP	Aerial Exchange Cable	REA-PE-22
8	PBW	One Pair Armored Burial Wire	REA-PE-24

No.	Cat. No.	Type	Specification
9	DBCP	Direct Burial Exchange Cable	REA-PE-23
10	OPDW	One Pair Aerial Distribution Wire	REA-PE-17
11	ADCP	Aerial Exchange Cable	REA-PE-22
12	—	Retractile Cords	—
13	AS48	Figure 8 Aerial Exchange Cable	—
14	IP	Inside Station Wire	—
15	ADCP	Aerial Exchange Cable	REA-PE-22
16	IPL	Parallel Inside Station Wire	—

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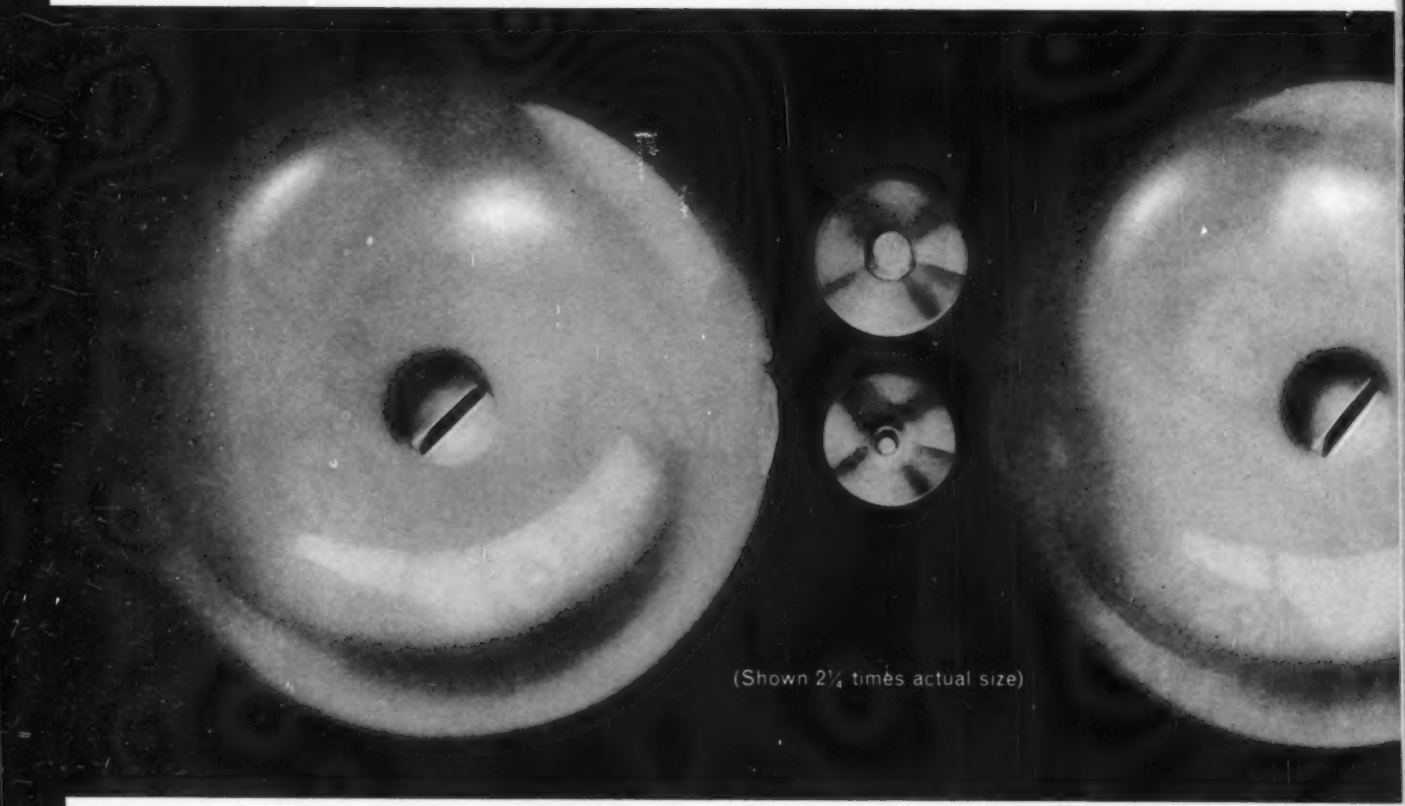

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tive to keep the ownership as nearly in balance as is practicable.

This rate problem has been an obstacle in negotiating joint-use contracts for quite some time, but like the voltage limitation clause, which was finally resolved, I am confident that an equitable and acceptable solution can be worked out.

Since we of the telephone industry seem to be on the short-end of this difficulty, it is up to us to take the initiative in the matter, but certainly the effort should be according to a complete united and uniform pattern. I concur wholeheartedly in the recommendations made by P. M. Ferguson Jr. in the closing remarks of his address on joint-use at the 1961 convention of the United States Independent Telephone Association (TELEPHONY, Oct. 21, 1961), and especially the implication relative to the rate problem, "Ignoring it won't make it go away."

Rural Joint Use

Because of the radical departure of rural construction standards for both power and telephone plant, the requirements and specifications normally applicable to city and urban joint construction are not generally acceptable.

Both utilities have long since gone to long-span construction and, because of the character and gauge of their respective line conductors, there is considerable sag differential which has a definite bearing on the average span lengths. This long-span joint construction often necessitates setting an intermediate telephone pole to compensate for sag difference. Under such conditions, it may be necessary to negotiate a separate joint contract for rural areas.

There are quite a few rural joint-use contracts presently in force between REA electric systems and telephone companies. These contracts take into account pole heights commensurate with maximum span lengths and conductor sags, consistent with maximum safety and economic possibilities. Under these contracts the REA recognizes the telephone company's position with respect to space requirements and rental rates, since the contracts provide for a non-reciprocal or unequal ratio rate which is of the 40-60 ratio, or close approximation thereof.

Special Treatment Situations

Under any joint-use arrangement, there will be situations that require special treatment, which involves the best engineering solution referred to earlier in this paper. As an illustration of such a situation, the following is cited: the power and telephone companies operating under a contract where the compensation is based on the licensee bearing one-half of the pole maintenance costs.

The subject situation involves the power company's need for utilizing a section of existing joint-use for a 34.5 KV feeder route. Based on the best engineering solution, the high tension joint-use was carried out which necessitated the use of 65 and 70-foot poles.

50-50 Basis Out

In addition to employing the special protection features discussed earlier, e.g., bonding the power line neutral to the telephone cable strand sheath and/or shielding, etc., and fast de-energizing switchgear, it was obvious that the telephone company could not be expected to bear 50 per cent of the maintenance of 65-foot and 70-foot poles.

Therefore, for the section of this high tension joint-use (29 poles), the power company replaced the poles in this section with the required height poles, and a special rate for the telephone company's 100-pair cable was developed, in the form of a facility license carrying a nominal contact rental per pole, per year. See *Figs. 6* and *7* for actual conditions.

This is a concrete example of the power company's constant expansion that calls for higher poles. A study of *Fig. 2, 3, 6* and *7* verifies the power company's need for more space and higher poles, whereas the telephone company's space requirements remain unchanged.

Buried Plant Involved

This paper is devoted to the evolution of joint construction, and the development of contracts dealing with joint-use of wood poles by power supply and communications companies, and particularly the problem of developing an equitable apportionment of joint-use costs, especially insofar as the telephone company is concerned.

It is sincerely hoped that this information will be helpful to telephone companies which may be considering, or are in the process of negotiating a joint-use contract.

A new problem of joint construction is rapidly coming to the fore in the form of joint underground construction, where both power primary and secondaries and telephone cable will be placed in a common trench. This appears to be a very promising venture, particularly in newly developed, high-grade residential areas, and may

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ultimately displace some of the existing aerial joint-use.

Buried telephone construction is not new. This type of plant has been in the field for quite some time for toll, exchange, and rural facilities. As in the case of buried telephone plant, where many new techniques had to be developed, most noteworthy of which is the direct ploughing method, this joint underground venture will call for new methods of construction, along with the development of new materials, hardware and tools. Then there will be joint underground specification, protection and maintenance practices, and, last but not least, the question of how do we equitably apportion the costs.

Since it appears that underground joint construction is not a wild dream, it is believed that proper solutions will be forthcoming. There is, however, very little in the way of experience that can be drawn from the joint pole situation, except that the contracts covering this type of construction should contain sufficient latitude to provide adequately for situations that cannot be visualized from here.

A good start has already been made in this new field by a series of trials that have been underway for the past four or five years by the Illinois Bell Telephone Co. and the Commonwealth Edison Co., mostly in the near Chicago area.

For some of the details of this new venture, see Ray Blain's three-part article in the September, 1961 issues of TELEPHONY.

SPACE COMMUNICATION

Continued from page 20

as quickly as possible will be by creating the organization for getting the job done. S. 2814, as amended by the Senate Space Committee, provides a workable and comprehensive plan for such an organization, and I would urge this committee to take prompt and favorable action on it."

FCC For Private Enterprise

The government officials closest to the communications industry are, of course, the commissioners and staff of the FCC. Speaking for the majority of the commission, Chairman Newton N. Minow supported the amended administration measure in his statement. Recalling his testimony before other congressional committees on the subject of space satellite legislation, Mr. Minow said:

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committees that commercial communications via satellite should be the responsibility of private enterprise under federal regulation, and within such framework, a space communications system would be most effectively developed through placing the ownership and operation of the United States interest in such system in the hands of our communications common carriers. We also recommended that certain safeguards be included in the bills to assure that the benefits of this new development would be quickly realized in a manner most conducive to the public interest, and suggested revisions in various provisions of the bills.

"Although S. 2814 as amended by the Space Committee differs in certain respects from the views we have expressed, in most essential aspects it is in accord with public interest and national policy objectives to which the Commission subscribes.

"Thus, it provides for the formation of a privately-owned corporation to represent the United States interest in the establishment, ownership, and operation of a global system. We fully concur. For, it is our conviction that the interests of the United States in a global space communication system can be effectively promoted within the context of our traditional philosophy—that is, by the initiative and resources of private enterprise within the framework of appropriate Federal regulation."

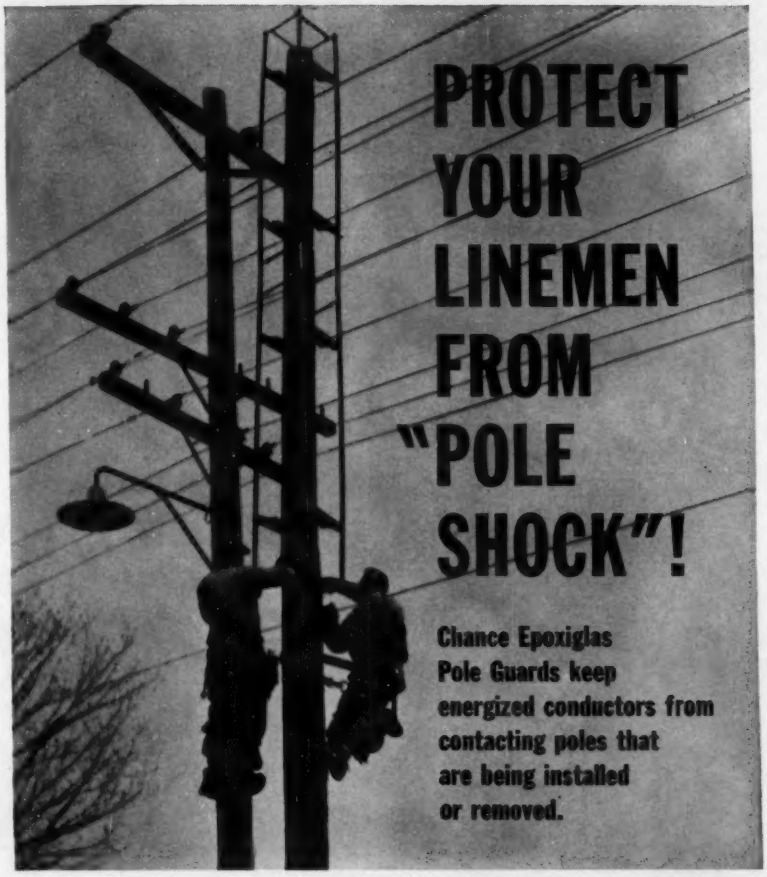
AT&T Urges Action

James E. Dingman, executive vice president of the American Telephone & Telegraph Co., told the committee that it is imperative that satellite communications legislation be enacted by this session of Congress.

Postponement of legislation could "deprive the United States of the initiative in this field in which it now holds the lead," Mr. Dingman said.

He labeled as "sheer nonsense" allegations that a proposed satellite communications corporation will make large profits on research paid for by the government. He said that the corporation "will pay for everything it gets"; lose money for a substantial period; and, as a regulated utility, earn only a reasonable return on plant investment.

Mr. Dingman pointed out that the lead which the United States now has in satellite communications is principally in the vital communications components, such as transistors, masers and solar batteries—"all of which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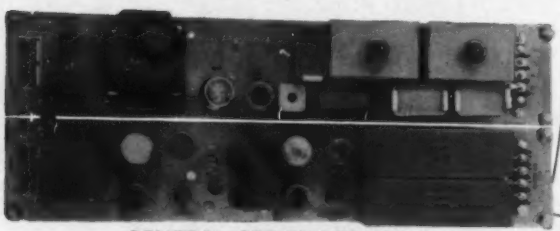

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Carriers Should Own Stations

Mr. Dingman described as "nonsense" the claims that communication companies might retard development of satellites because such development would obsolete the companies' present overseas facilities. He told the committee that a satellite system would supplement the existing world-wide communications network and would "provide added security and reliability."

He said satellites would make available alternate routes and afford direct access to those areas now reached only by radio or by intermediate land links.

The AT&T executive advocated the ownership and operation of ground stations by the communications companies since they "are responsible for the operation" of the current network. He said that divided responsibility for operation of the ground stations "will prove impractical and will degrade service to the public."

He called for ownership of the proposed corporation by the communications companies and disavowed any "motive or intent" by AT&T to dominate the new corporation. He said that "no carrier should be allowed to control the board of directors" and that "there should be appropriate governmental regulation" to prevent any company from gaining "any competitive advantage from its investment in communications satellites."

Mr. Dingman called for the "establishment of an operable communications satellite program at the earliest practicable time." He told the senators that "this is of paramount importance and transcends all other considerations."

ITT Urges Carriers Control

International Telephone & Telegraph Corp. spokesman, John A. Hartman Jr., vice president of American Cable & Radio Corp., an ITT subsidiary, expressed the view that "satellites should be operated as an extension of existing communications systems which include also cable, wire and radio networks already extending throughout the world."

"Indeed," said Mr. Hartman, "the most recommended satellite system, using synchronous satellites, may well necessitate the combined use of satellites and submarine cables to establish a proper telephone circuit between very distant points on earth in order to avoid two satellite relays in succession.

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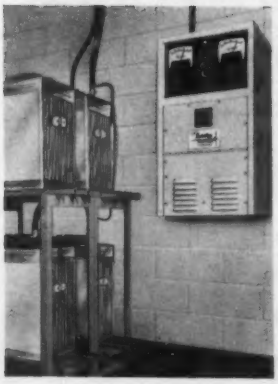

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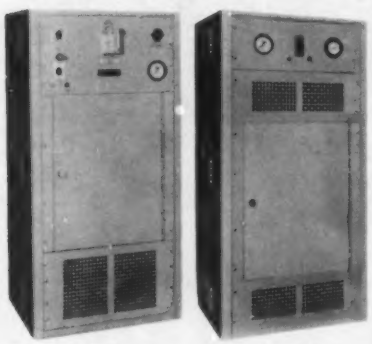

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"Satellites should be joined to the existing techniques and equipments as tools of the communications trade and, as such, should be controlled by the common carriers who will use them.

Will Go Along With S. 2814

"To create the satellite corporation as a new element in a field entirely independent of existing communications systems will create a serious problem of dilution of existing communications investment and danger of conflict of interest."

Mr. Hartman reiterated ITT's view that ground transmitting and receiving facilities should be owned and controlled by the common carriers, as permitted in the revised version of the Senate bill covering the situation.

He assured the Senate committee that if Congress determines that the form of ownership provided in the bill is in the public interest "ITT will do all that it can to help solve the problems that arise and to make the fullest contribution possible to the effective development and use of the system."

Beck Speaks for Hawaii Company

The writer, supporting the amended S. 2814, and speaking on behalf of Hawaiian Telephone Co., stated:

"Because of our geographical location and the projected traffic forecast in the Pacific area, we believe that the use of space satellites as another medium for communications is ideally suited to our operations.

"We still favor the proposals by the *Ad Hoc* Carrier Committee with regard to ownership of the satellite corporation and would prefer that ownership be limited to carriers who are authorized by the FCC. However, if all other matters we discuss in this statement are modified substantially in accordance with our recommendations, we believe that common stock equity ownership on the part of the public of not more than 50 per cent is a matter that can be worked out satisfactorily. In this connection, we prefer that the investing carriers elect one-half of the membership of the board of directors. Likewise, we feel that one-half of the incorporatiors should be representative of the carriers signifying a willingness to purchase stock, and that the incorporators should be directed by the bill to

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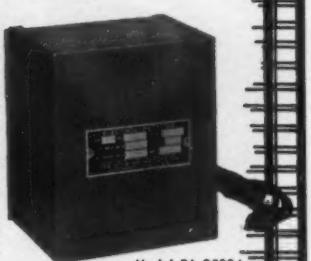

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"Our attendance at this and other hearings on this subject has demonstrated to us the willingness of the members of Congress to consider the viewpoints of the carriers and others. In this statement we have modified certain of our own views on the subject of space satellite legislation. We have done this because of the importance of establishing at the earliest possible date a commercially operable space satellite communications system."

Hearings To Continue

The writer concluded his statement to the communications sub-committee by emphasizing "that Hawaiian Telephone Co. feels that its future is inextricably part of any proposed worldwide space satellite communications system. We participated in the discussion of the Federal Communications Commission's Ad Hoc Carrier Committee, and stated our willingness to invest a sum not to exceed 2 million dollars in a common carrier joint venture as proposed by that committee; and, if S. 2814 is passed with substantially all our suggested modifications, we are still willing to make the same commitment."

The hearings continue in both Senator Pastore's Sub-committee on Communications and Senator Kefauver's Sub-committee on Antitrust and Monpoly. It is anticipated that both subcommittees will conclude their hearings prior to the traditional Easter recess declared by Congress. It is difficult to predict when a Senate version of a space satellite communication bill will be reported to the floor of that body.

Meanwhile, Rep. Oren Harris (D, Ark.), chairman of the House Interstate and Foreign Commerce Committee, is keeping his committee busy in executive session discussing space communication legislation. It should be a matter of a short time before his amended version of H. R. 10115 is reported out of committee.

This concludes the current series of articles "About Space Communications." Not intended as a technical discussion of the subject, it is hoped that certain organization problems and legislative efforts on the subject have been clarified for TELEPHONY readers.

N.Y.-Belgrade Phone Link

A direct radio-telephone link between New York and Belgrade will be set up at the end of this month, according to the Yugoslav news agency Tanjung.

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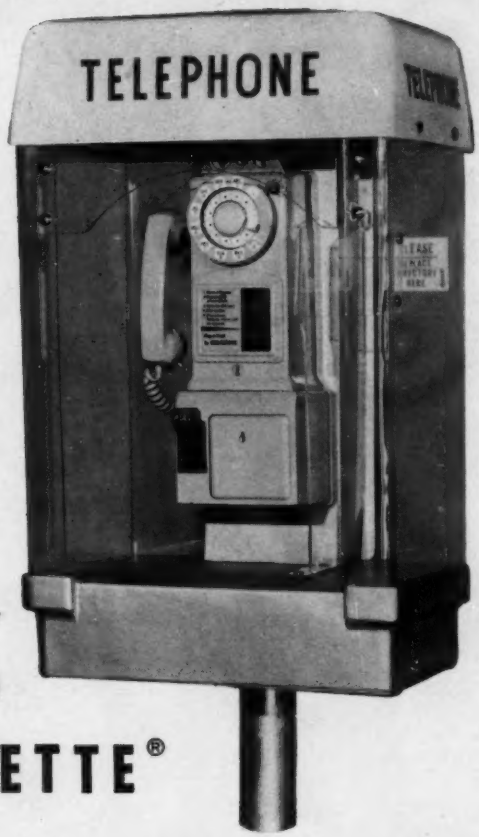

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Coffman Named to Position At General of Kentucky

Joseph E. Coffman has been named chief engineer for General Telephone Co. of Kentucky, according to the company's operating vice president, Gordon Sauders. Coffman goes to Kentucky from the General Telephone and Electronics Service Corp., in New York. He has assumed the position of Raymond Soard, Jr., who resigned.

Mr. Coffman began his career as a draftsman for General Telephone Co. of California. He held successive

J. E. COFFMAN

engineering positions of increasing responsibility wtih that company until 1956 when he was named fundamental plans engineering supervisor.

In July, 1957, Mr. Coffman was appointed general plant extensions engineer for General Telephone Co. of Indiana at Fort Wayne. In October 1959, he was named exchange planning engineer for GT&E Service Corp., the position he held before going to Kentucky.

He is a native of Missouri and attended Flat River College, the University of Colorado and U. C. L. A. of which he is a graduate. He is a Navy veteran of World War II.

Association Pays Tribute To Dr. R. H. Manson

The Electronic Industries Association recently paid tribute to the late Dr. Ray H. Manson in the form of a resolution, which said in part: " . . . Be it resolved, that the members of the board of directors of the Electronics Industries Association on this day of March 16, 1962, hereby express their profound sorrow at the passing of Dr. Ray H. Manson and instruct the secretary to convey their condolences to his family and to his former associates in the General Dynamics Corporation."

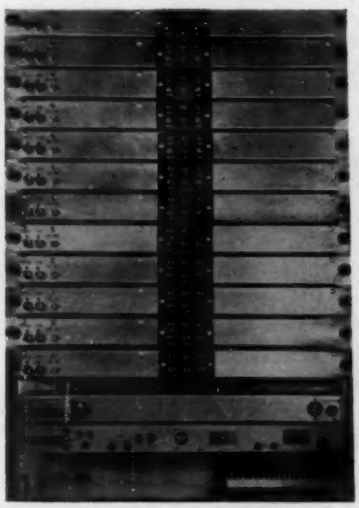
INTERNATIONAL TELETRONICS, INC.

TRANSISTORIZED CARRIER EQUIPMENT

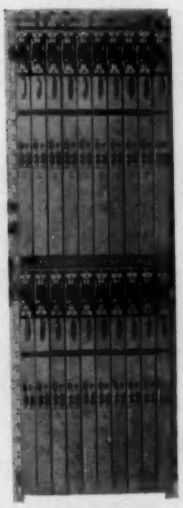
PANHANDLE

Type "X"
20 Channels

Type "LN"
12 Channels



Type "XL"
20 Channels



Type "X Multiplex"
20 Channels

Panhandle's continued development has made it possible for standard packaging of the basic components for all four types of equipment effecting several economies. The type "X" is a short haul cable carrier designed for toll, EAS or urban and rural subscriber service. Type "LN" is compatible to meet Western Electric "N1" type carrier and is fully transistorized. The type "XL" is a ten channel, two wire system and can be applied to either open wire and/or cable for rural subscriber or EAS service. Type "X" multiplex is designed for low density (to 80 channels) microwave systems. Also available, but not shown, is our "XL" four channel high group which permits 25% growth above the "O" frequency range. Test equipment and procedures have been greatly reduced and simplified for all type systems.

FOR COMPLETE DETAILS WRITE OR PHONE

INTERNATIONAL TELETRONICS, INC.

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IN THE NATION'S CAPITAL

Continued from page 18

distribution be given to the U. S. Government Organization Manual (which gives a description of the organization and function of the various federal agencies); (4) that private contractors be apprised of what evidence the federal contracting officers want when a contract is in dispute, and (5) that the power of regulatory agencies be broadened to enable them to issue subpoenas and vigorously enforce those cases where individuals served with subpoenas fail to obey them.

Sylvester C. Smith Jr., president-elect of the American Bar Association, told the conference that there had been considerable criticism of administrative agencies' procedures and the remedies offered by the group "may be much wider in scope and contrary to some concepts that have been built within the agencies themselves."

Weather Calls Set Record

The number of telephone calls for recorded forecasts of the Weather Bureau of the U. S. Department of Commerce, climbed to a new alltime high in 1961. The weather number was dialed more than 216 million times, an increase of 10 million over 1960.

The recorded forecasts, provided by telephone companies to those who dial the correct number, were available throughout the year in 11 cities. On Dec. 22, the 12th such service began operation in Los Angeles.

New York City's total of 37,296,238 calls during the year was the highest for any city. The highest number of calls in any one day—477,148—was recorded at Washington, D. C., on Jan. 26, after a heavy snow warning had been issued.

The first automatic telephone service was established by the Weather Bureau and the New York Telephone Co. in 1939. In the 12 cities where the service is now available, the local telephone company prepares a new recording each hour, using the latest weather information received from the Weather Bureau by teletypewriter or telephone.

Before the automatic telephone service was available, many people called the local Weather Bureau station for the forecast. Now weather information can be disseminated automatically, leaving the weatherman free to devote his time to preparing the forecast.

Plan Intercontinental TV

At a meeting in Seville, Spain, American and European broadcasters worked out plans for the first live intercontinental television program which will be broadcast by AT&T's Telstar satellite. Seventeen nations were represented at the meeting. The first show seen by Americans will probably be a European travelogue. The U. S. show will originate from the Bell System's Andover, Me., facility and will be rebroadcast live to European audiences.

Traffic Measurements

Continued from page 44

others will be found in the afternoon. For this reason, the study should be taken from 9 a.m. to 12 noon, and from 1 p.m. to 4 p.m. daily, and for at least four days. Readings should be taken every half hour, resulting in five hours each period, i.e., 9 a.m. to 10 a.m., 9:30

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As you well know, profit on this toll call is not the charge (bottom line) but what you keep after all costs of doing business are taken out. When you utilize the cost saving Premium AuTollizer on person-to-person, collect, or third party calls, a larger share of the charge becomes profit. Operating Companies equipped with North Electric Premium AuTollizer have its advantages proved daily in dollars and cents . . . by increased revenue, reduced operator load, and reduced handling costs. In addition, Premium AuTollizer equipment puts you in the nationwide DDD network with full capability to handle all classes of toll calls.

With profit on toll calls being measured in pennies these days, it seems wise to employ equipment that will give you the greatest profit break.

You can get your "one way ticket to profit" from The Dynamic Force in the Telephone Industry.

OTHER DIVISIONS:
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NORTH ELECTRIC
TELECOM DIVISION · GALION, OHIO

a.m. to 10:30 a.m., 10 a.m. to 11 a.m., 10:30 a.m. to 11:30 a.m., and 11 a.m. to 12 noon; similarly for the afternoon period. The 24 hour daily peg-count is an essential part of the information being sought so the measuring set will be left continuously in operation for the entire length of the study.

Initial Summary

Upon completion of the study, the hourly peg-count and scan differences will be calculated for each day by subtracting the 9 o'clock reading from the 10 o'clock reading, to obtain values for the hour of 9 a.m. to 10 a.m., the 9:30 o'clock reading from the 10:30 o'clock reading, for the hour of 9:30 a.m. to 10:30 a.m., and so on.

Assuming we are considering the five trunks 52421-52425 of the Smalltown Stock & Bond Co., the next step would be to add together for each hour the individual trunk peg-counts and the scan figures of each associated trunk. The resulting figures will be the total peg-counts per hour for the five trunks and the total scan figures for the five trunks.

SMALLTOWN STOCK AND BOND COMPANY
Trunks 52421-52425

5 Trunk Totals—
Scan to be multiplied by 3 to obtain call-seconds.

	Jan. 15		Jan. 16		Jan. 17		Jan. 18	
	Scan	PC	Scan	PC	Scan	PC	Scan	PC
9:00 AM-10:00 AM	1126	29	1442	30	1166	22	1557	37
9:30 AM-10:30 AM	1299	35	1322	28	1328	24	2260	36
10:00 AM-11:00 AM	1993	38	2400	49	1784	31	1955	39
10:30 AM-11:30 AM	2880	40	1752	33	3130	52	1881	34
11:00 AM-12:00 Noon	2647	43	2390	35	2405	35	1875	30
5 Hr. Totals	9945	185	9306	175	9813	164	9528	176
1:00 PM-2:00 PM	1410	37	1762	38	1552	27	1678	35
1:30 PM-2:30 PM	1378	35	1975	37	1674	33	1725	29
2:00 PM-3:00 PM	1526	41	1930	33	2390	31	1890	39
2:30 PM-3:30 PM	1986	29	1842	29	1913	26	1874	43
3:00 PM-4:00 PM	1728	28	1691	19	1665	23	1777	36
	8028	170	9200	156	9094	140	8944	182
24-Hour Pegcount		434		415		451		

(Obtained by subtracting the 9:00 A.M. peg-count total of the first day from the 9:00 A.M. peg-count total of the second day, etc.)

With the data summarized as shown above, the second step would be to pick out the highest scan reading for each day. It is found to be 10:30 a.m.-11:30 a.m. on Jan. 15; 10 a.m.-11 a.m. on Jan. 16; 10:30 a.m.-11:30 a.m. on Jan. 17; and 9:30 a.m.-10:30 a.m. on Jan. 18. Multiplying each reading by 3 seconds and dividing by 100, we arrive at the following Busy-Hour 100-call second figures: Jan 15, 86 CCS; Jan. 16, 72 CCS; Jan. 17, 94 CCS, and Jan. 18, 68 CCS.

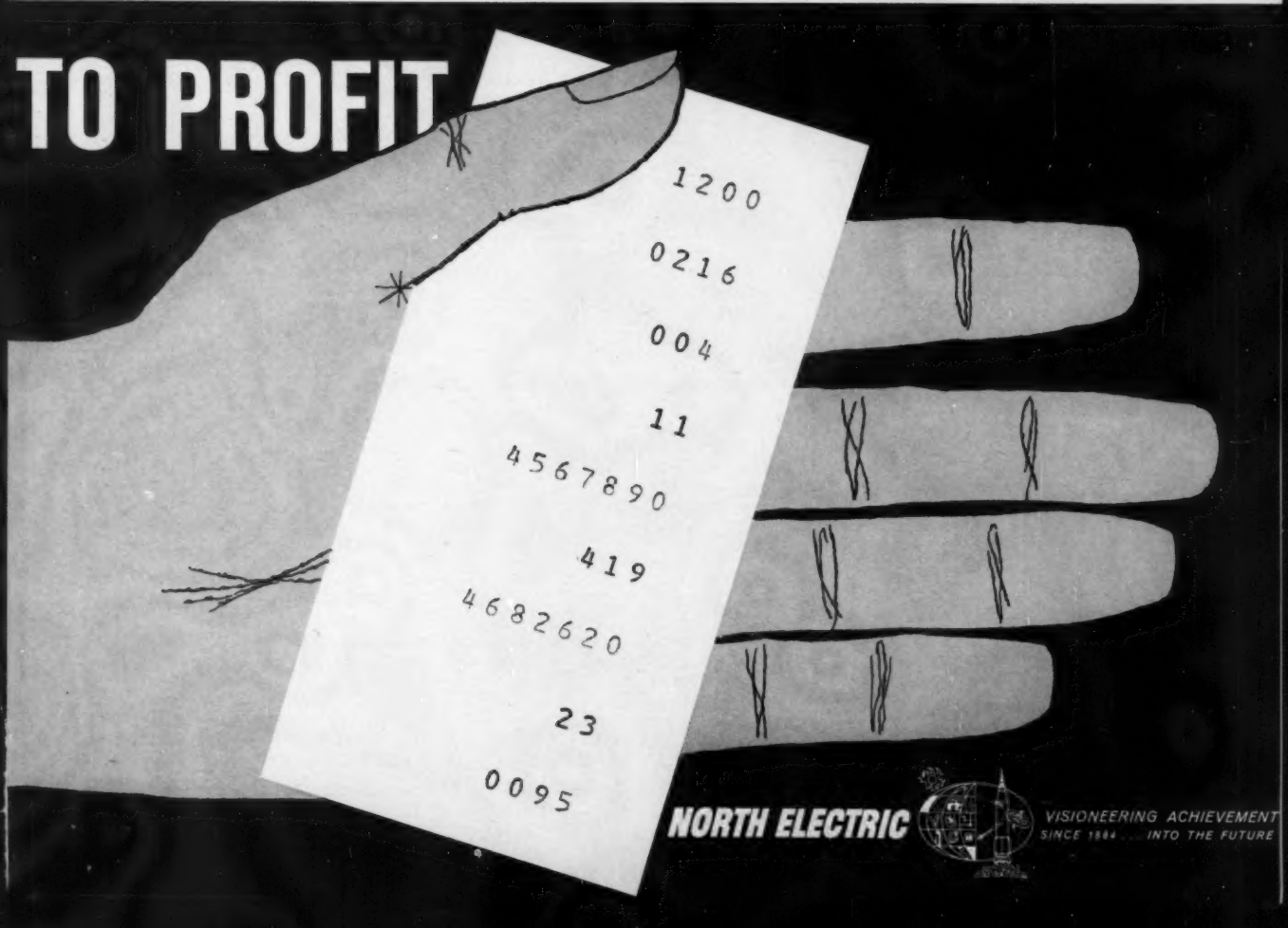
Preparing Final Study

The information obtained by the study can be accurately and concisely shown under three main divisions:

Part 1. Summary Sheet.
Part 2. Details of Study Sheet.
Part 3. Dial Office Call and Holding Time Data Sheet.

Typical examples of each part are shown below and are, for the most part, self-explanatory.

(Continued on page 86)



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PART 1. SUMMARY SHEET

Smalltown Stock & Bond Company
Traffic Study—Smalltown, U.S.A.
January, 1962

PURPOSE OF STUDY. The purpose of this study is to determine the adequacy of the existing trunking between the SMALLTOWN STOCK AND BOND CO. and the Smalltown central office of the telephone company.

This information was requested by the Unit Sales Manager.

COLLECTION OF DATA. Automatic meter sets with co-related seconds usage and peg-count meters were used to establish the length of the holding time in seconds and the total number of calls to and from the central office. The hours of study were from 9 a.m.—12 Noon and from 1 p.m.—4 p.m. daily. Readings were taken every half-hour of the study periods. The study period was four days, Jan. 15 to 18, 1962, inclusive.

SUMMARY	Central Office Trunks Indicated	Installed	Add'l Req'd
Central Office Trunks 52421-52425	7	5	2

Additional Information Requested By Customer

Average Number of Daily Calls	433
Average Number of Busy-Hour Calls	48
Average Holding Time per Call	165 seconds

Standard Grade of Service is 1 lost call in 100 calls.
Present Grade of Service is 9 lost calls in 100 calls.

PART 2. DETAILS OF STUDY SHEET

DETAILS OF STUDY
Rotary Group Trunk
Nos. 52421-22-23-24-25 (5 trunks)

DATE, 1962	BHCCS, 2-Way C.O. TRUNKS
Jan. 15	86
Jan. 16	72
Jan. 17	94
Jan. 18	—68—
No. of Days Considered	3
Total	252
Average BHCCS	84
No. of Central Office Trunks Indicated[1]	7
Present No. of Central Office Trunks	5
Additional Required	2

[1]Based on .01 Grade of Service, specified by customer.

PART 3. DIAL OFFICE CALL AND HOLDING TIME DATA

FROM and To Smalltown Stock & Bond Co. **EXCHANGE Smalltown USA**
TO and From Smalltown Central Office **OFFICE Smalltown USA**
TOTAL TRUNKS IN GROUP 5 **DATE January, 1962**
NO. TRUNKS OBSERVED 5

Rotary Trunk Nos. 52421-52425

AVERAGE HOLDING TIME PER CALL

1962	Daily				Cumulative					
Date	Time	Calls	Call-Sec	Av Ht	Days Obs	Calls	Call-Sec	Av Ht	% Var
Jan. 15	9:00 AM-12:00 N	185	29835	161	1	185	29835	161	—
Jan. 16	9:00 AM-12:00 N	175	27918	160	2	360	57753	160	—.6
Jan. 17	9:00 AM-12:00 N	164	29439	180	3	524	87192	166	3.8
Jan. 18	9:00 AM-12:00 N	176	28584	162	4	700	115776	165	—.6

BUSY HOUR CALLS

FROM DATE	FROM TIME	TO DATE	TO TIME	Busy Hour	BH Calls	Daily Calls	% in BH
Jan. 15	9:00 AM	Jan. 16	9:00 AM	11:00 AM-12:00 N	43	434	9.9
Jan. 16	9:00 AM	Jan. 17	9:00 AM	10:00 AM-11:00AM	49	415	11.8
Jan. 17	9:00 AM	Jan. 18	9:00 AM	10:30 AM-11:30AM	52	451	11.5
TOTAL					144	1300	
AVERAGE					48	433	11.1

SUMMARY

(1) AV HT PER CALL 165 seconds **(3) PER CENT DAILY CALLS IN BH 11.1**
(2) AV CALLS PER BH 48 **(4) BH CCS** $\frac{1 \times 2}{100}$ **(Calculated) 79**
Measured 84

(Continued on page 88)

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PABX
TYPE UH

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Norelco TELEPHONE PRODUCTS AND SYSTEMS DEPT.

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100 East 42nd Street, New York 17, N. Y.
Area Code: 212 - OXford 7-3600

Following is an example of how the above data may be summarized:

Part 3—Dial Office Call and Holding Time Data sheet—is the *key* to the information requested by this telephone customer, and from which we obtain:

(1) The average number of daily calls.

(2) The average Busy-Hour calls (which is the average of the highest number of calls peg-counted in any hour of each day).

(3) The average holding-time per call (which is the accumulated number of peg-counts divided into the accumulated number of call-seconds).

It is important to understand that a high number of peg-counts will not, of itself, indicate additional trunk requirements; or a lower number of peg-counts, a reduction of trunks required. To clarify further, suppose we were measuring one trunk, and at the beginning of the hour it was seized and remained so in use for exactly one hour, or 3,600 seconds.

The peg-count register would count only one call, but the scan meter would indicate 36 units of 100 seconds each, or the equivalent of one Traffic Unit. We have, in this instance, a very low peg-count, but the circuit was constantly occupied and not available for additional calls in either direction. Peg-counts, or the number of calls handled per day, however, may oftentimes be associated in the mind of the customer as indicative of, and in direct relationship to, the amount of business he does, and for this reason was given in the example shown.

The equipment used and the information detailed above are designed for the specific purpose of studying small rotary trunk groups of 10 or less trunks in the central office. They can, in many cases, be co-related to be taken concurrently with studies of the central office proper, with attendant savings.

Subscribers with more than 10 trunks to the central office usually have Private Automatic Branch Exchanges of 100 lines or more. Such large telephone users will be interested in knowing all the details equipment-wise of their installation. They may, for instance, be interested in the percentage of traffic in each direction (to and from) on their two-way trunks. This and other details would require a study of the PABX installation on the customer premises and involves different methods and procedures from those outlined.

Obituaries

WILLIAM A. SEELY, 76, of Norwich, N.Y., chairman of the board of directors, Chenango & Unadilla Telephone Corp., Norwich died on Apr. 18, at Mary Imogene Bassett Hospital in Cooperstown, N. Y.

Mr. Seely began his telephone career in 1906 as a switchboard worker with New York Telephone Co. at Elmira, N. Y., later accepting a position as assistant manager and collector with the Valley Telephone Co. at Sayre, Pa., which was a part of the Federal Telephone & Telegraph System.

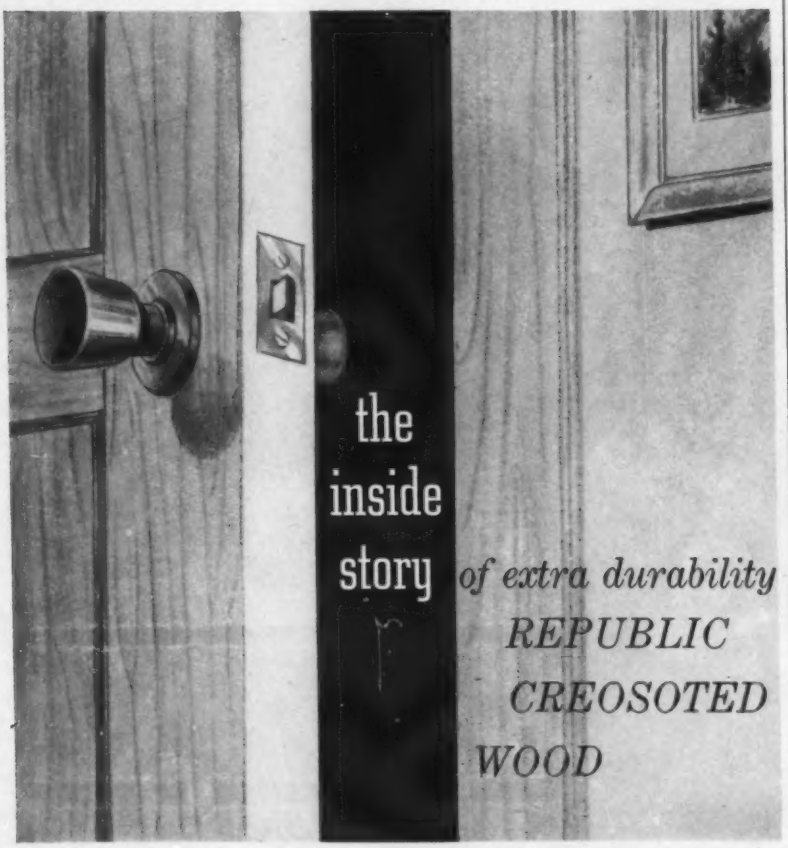
From Sayre, he was transferred to the headquarters of the Federal System at Buffalo, N. Y., where he eventually became superintendent of exchanges. When the Federal System was taken over by the New York Telephone Co. in 1918, Mr. Seely remained in Buffalo for a time as traffic manager.

He went to Norwich in 1920 as general manager of the Marquis Telephone Co., when that company was organized in 1922 from the Marquis, New Berlin and Waterville companies.

In 1939, Mr. Seely was elected vice president and general manager, and in 1940 president and general manager, a position he held until he became chairman of the board in 1961.

Mr. Seely served as director of New

(Continued on page 91)



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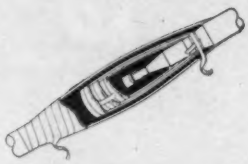

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Send for our fully-illustrated catalog. It includes a brochure describing the new Bi-Cast epoxy-wrap method for simplified splicing, terminating and repairing of paper-lead cable.

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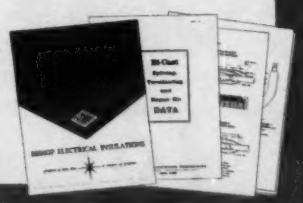

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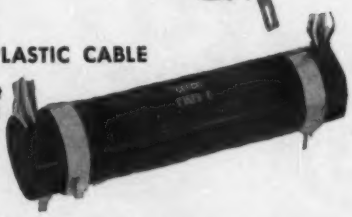

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"BOLT MOUNTING"

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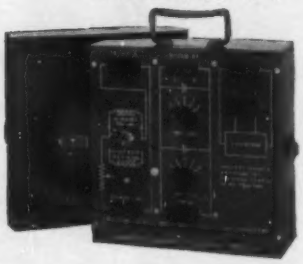

C-100 Test Set for making acceptance tests and locating loading irregularities.

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Easy To Use
Reliable
Guaranteed Results

C600A1 CASE

C600A1 Case equipped with 10-C1574A Inductor capacitors or loading coils for mounting on horizontal side of MDF.

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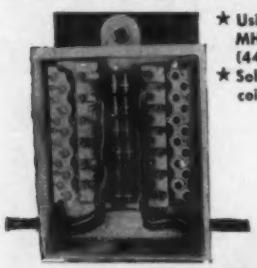

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No. CP16-133

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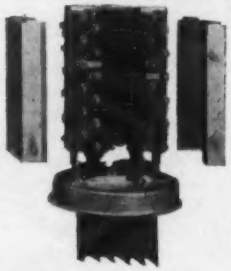

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York State Telephone Association continuously from his first election in 1922 until his resignation in June 1961. He was president of the association in 1947 and 1948 and, in addition, had served on many committees of both state and national telephone associations. He was a life member and member of the executive council of Telephone Pioneers of America and a member of Independent Telephone Pioneer Association.

Born at Newfield, N. Y., on Apr. 3, 1886, he received a public school education, completing his course in high school at Waverly, N. Y.

He is survived by his widow, Mabel E., a daughter, Mrs. William S. Kingman; two sisters; two grandchildren, and five great grandchildren.

•

Edward Lewis Swartz, chief operating engineer of Automatic Electric, died Sunday, April 15, in Chicago, after an illness of five months. Following funeral services in Chicago, the body was taken to Princeton, Ill. for burial.

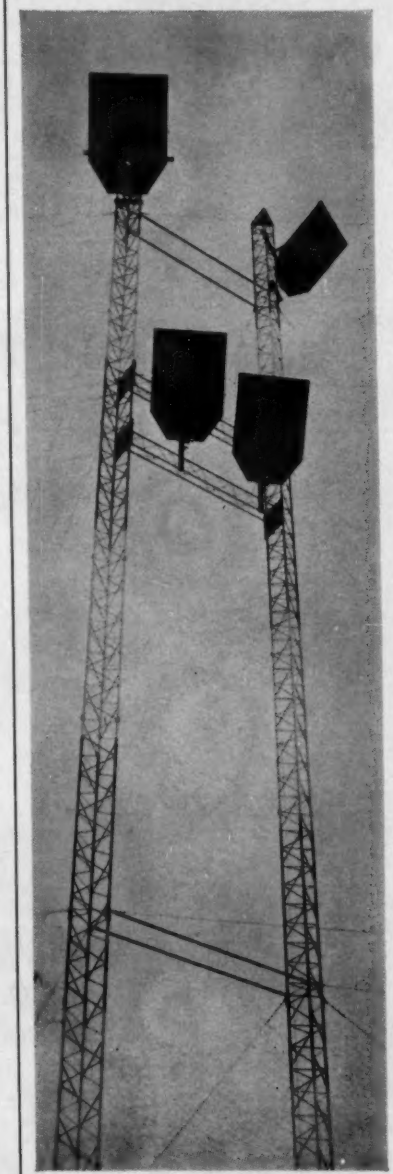
Mr. Swartz was born in Princeton in 1901, and joined Automatic Electric in 1919. He was one of a number of engineers loaned to Automatic Telephone Mfg. Co., Liverpool, England, in 1923 for the engineering and installa-

E. L. SWARTZ

tion of Strowger Automatic in London—at that time the world's largest installation of dial equipment. In 1924, when several large exchanges in Tokyo were converted to Strowger Automatic, Mr. Swartz was there, and personally installed the telephone equipment in the emperor's palace.

In 1936 he joined the installation staff of Michigan Associated Telephone Co. (now General Telephone Co. of Michigan), Muskegon. Returning to AE in 1938, he supervised installations

ROHN MICRO-WAVE TOWERS



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"Pioneer Manufacturers of Towers of All Kinds"

in all parts of the U. S. and in Ireland, including many government installations during the war. Beginning with the first installation of Strowger Automatic Toll Ticketing (SATT) in 1944, he was associated with several major installations of this equipment. In 1946, he was sent to Colombia, S. A., to install equipment for Compania Telefonica del Valle.

Returning to AE in April, 1948, Mr. Swartz was appointed a staff engineer, and in 1951 was named chief operating engineer - the position he held at the time of his death.

Mr. Swartz held two patents for improvements in telephone equipment.

British Announce Global Cable Link with S.E. Asia by '66

The British General Post Office on Apr. 9, according to the AP, announced a plan to complete by 1966 a cable linking Australia with south-east Asia and Hong Kong. This latest cable will be a link in a global chain of cables joining countries of the British Commonwealth.

The first part of the Commonwealth Pacific cable (COMPAC), which will link Canada, Australia and New Zealand, is scheduled for completion in July this year. In early April, the HMTS "Monarch" sailed to lay the cable between Sydney, New South Wales, and Auckland, New Zealand. It is expected that by the end of next year, the cable will have also been continued, via Fiji Islands and Hawaii, across the Pacific to Vancouver, and will link by microwave across Canada with the Commonwealth transatlantic cable (CANTAT), which was opened last December.

The new cable to be constructed at a cost of 22½ million pounds, is to be called the South-East Asia Commonwealth cable (SEACOM). It will link the Federation of Malaya, Singapore, North Borneo, Brunei, Sarawak, Hong Kong, and New Guinea.

The projected plan follows the recommendation of Commonwealth representatives, who met in Kuala Lumpur, Malaya, in June, 1961, and it is expected that "greatly improved" long distance telephone and telex services between south-east Asia and Australia, New Zealand, Canada, U.S.A., Britain and Europe will result. The planners also envision that these facilities will eventually be supplemented by satellite communications.

Huether Elected President, Ky. Chamber of Commerce

Harry J. Huether Jr. of Lexington, Ky., retired president and chairman of the board of General Telephone Co. of Kentucky, was elected president of the Kentucky Chamber of Commerce by the chamber's board of directors at the annual meeting on Apr. 10.

C. Hunter Green, vice president and

H. J. HUETHER JR.

general manager of Southern Bell Telephone & Telegraph Co. at Louisville, was elected first vice president of the chamber for the coming year.

Mr. Huether has served the Kentucky state chamber as a director for three years.

He is past president of the Kentucky

INTERNATIONAL TELECOMMUNICATIONS

Systems Planning

Federal Electric Corporation, prime contractor for Med-Tropo and Big Rally, is currently seeking communications specialists with maturity and ability to plan international communications systems.

We are now offering positions to senior engineering specialists who have a broad background in long lines and microwave communications and who are thoroughly knowledgeable of standard U. S. or European planning and operating specifications for large-scale telecommunication systems. A degree, a minimum of ten years' experience and proven ability to develop high quality, complex systems employing tropospheric scatter, microwave, radio and digital transmission systems engineered to advanced U.S.A.F. and international standards are our general requirements. Work requires world-wide liaison with various technical groups in the discussion and development of compatability objectives and operating parameters. We seek particular experience in Multiplex, Switching, Tropo-scatter, Microwave, Data Transmission and Power Systems.

For consideration and to arrange an interview, please send your resume to Mr. R. Hauserman, Professional Staffing, Dept. EL.

FEDERAL ELECTRIC CORPORATION

Service Division of International Telephone and Telegraph Corporation

Paramus Industrial Park, Paramus, New Jersey

An Equal Opportunity Employer.

Independent Telephone Association; director and past president of Associated Industries of Kentucky; director of Spindletop Research Institute; director of First Security National Bank & Trust Co. of Lexington; and trustee of the Kentucky Independent College Foundation. He is also a past president of the Lexington Chamber of Commerce, and has served as director of the Employers Council of Kentucky.

California Interstate Names Two to New Positions

The appointment of E. W. Ford, district plant superintendent at Inyokern/Ridgecrest, to central office equipment engineer has been announced by Willard Wade, president of California Interstate Telephone Co. Effective immediately, Mr. Ford will be in charge of the central office equipment engineering department, with headquarters in Victorville, and will report to the staff vice president, John H. Barrows.

E. W. FORD

E. L. KINDLE

The appointment of Edward L. Kindle, telephone installation foreman at Ridgecrest, to the post of plant superintendent at Ridgecrest also was announced. Mr. Kindle reports to C. N. Morris, southern district plant manager, and will remain in Ridgecrest.

Originally employed in 1950 as inside installer-repairman, Mr. Ford has served in the capacity of testboardman and central office light crew foreman, and prior to this appointment, as district plant superintendent since 1954.

Mr. Kindle began employment as apprentice shop repairman in 1947. Through the years he has served in various positions and since 1960, as telephone installation foreman in Ridgecrest.

Company to Use Seat Belts

The Bell Telephone Co. of Canada will equip its 5,700 vehicles with safety seat belts, officers said recently.

Front Runners

"As you move up, the pace becomes faster and the obstacles get higher . . . but the pack gets smaller. There are fewer men in the race at high levels, but they're all fast runners."—E. M. CLARK, Southwestern Bell Telephone Co., president.

water is what concrete and cinderblock WON'T...

ABSORB

when painted with KWAL-KRETE

KWAL-KRETE is the paint developed to protect, waterproof and beautify concrete and cinderblock. Because KWAL-KRETE weatherproofs the structure it calls a halt to deterioration caused by absorption of moisture.

KWAL-KRETE is used and approved in the communications industry—by leading telephone and telegraph companies from coast to coast, and by such firms as General Dynamics / Telecommunication, Division of General Dynamics Corporation.

For full information about KWAL-KRETE write today for a KWAL-KRETE Kit.

MAIL THIS COUPON TODAY!

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PROGRESS IN PAINT

Please send me your free KWAL-KRETE Kit.

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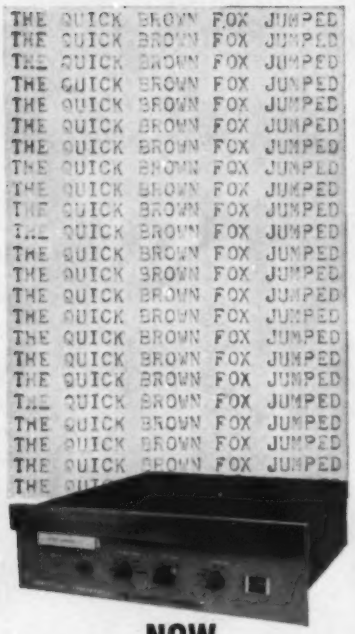
Mail to: Kwal Paints, Inc., 800 Water Street, Denver, Colo.



NOW

AUTOMATIC TELEGRAPH TEST

MESSAGE TRANSMISSION

WITH HIGHEST RELIABILITY

Radiation's new Model 7411 Test Message Generator is designed with all-solid-state circuitry to assure peak performance over a long, trouble-free operating life. The unit provides an 80-character message with speed accuracy of 0.02%. Standard telegraph speeds with a maximum rate of 150 bauds are controlled with a single switch (up to 600 bauds on special order). You can also depend on perfect transmission since test message information is stored on magnetic cores.

Other features: plug-in circuits control message format, speed, stop and information pulse length and operation from standard 105/125 v ac lines. Supplied with standard message, station identifying numerals and letters to fit your requirements. Other formats on request. For critical use, Model 7710 Time Base Generator furnishes a timing signal with stability of one part per million per day.

Write for full information. Dept. TT-42, Radiation at Orlando, 5800 McCoy Road, Orlando, Florida.

RADIATION Orlando

A Division of Radiation Incorporated

News on New Products

DEAD-ENDING GUYS—Three products to provide faster and more economical dead-ending of guys at the tops of wooden poles, H-frames and tubular metal structures have been introduced by Preformed Line Products Co.

Known as the Single-Wrap and Double-Wrap Dead-Ends and the Wrap Guy Link, the helical wire accessories are applicable to systems where it is preferable to use the "wrap" method of dead-ending rather than use special fittings which require drilling holes for attachment. According to the company, the Wrap Dead-Ends are easily applied, singly or double, by hand around the circumference of the pole. Of the three products, the Wrap Guy Link most nearly approximates the bolted-fitting application technique to which most linemen have been accustomed.

The Single-Wrap and Double-Wrap Dead-Ends will accommodate strands ranging from ¼ to 5/8 inches and pole or structure diameters of 7 to 26 inches. The Wrap Guy Link is designed to wrap dead-end strands from ¼ to 5/8 inches on poles and structures of any diameter.

The new Wrap Guy Link, according to the company, is easily installed in about half the time required for assembling conventional fittings. To apply the flexible unit, one end is wrapped onto the upper end of the guy strand and a small circle clip is crimped around the last turn to retain the tip of the strand. The strand is then wrapped around the pole and the opposite end is secured to it to form a single loop.

The company also says the new dead-ending units offer the additional advantage of pre-assembly on the ground, uniformity of application, positive grip, and tensile strength up to the RBS of the strand. Request NP1876.

•

CONSTANT OUTPUT AMPLIFIER—The Amplifier Corp. of America announces an amplifier which is said to maintain constant output by automatic volume control.

The company claims a 40 decibel change in input level produces less than a 2 db change in output.

It was designed for use with broadcast transmitters and telephone circuits. It consists basically of a two-stage push-pull circuit. The operating

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1876_____; NP1877_____; NP1878_____; NP1879_____;

NP1880_____; NP1881_____; NP1882_____; NP1883_____;

NP1884_____.

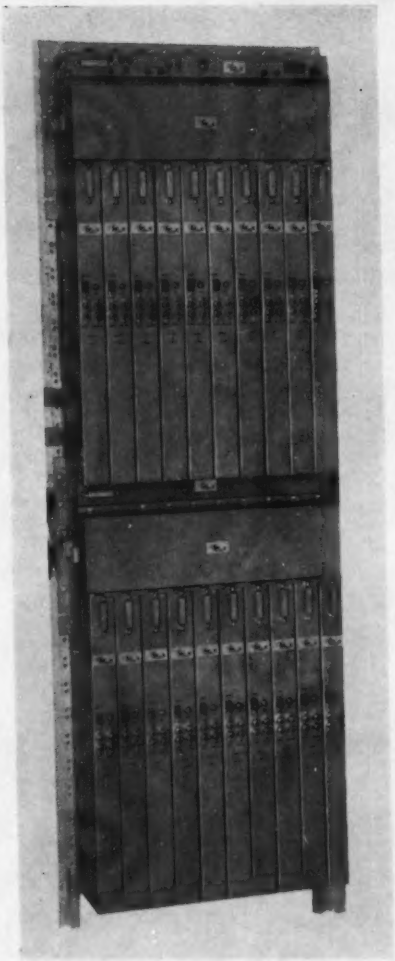
Name .....

Company .....

Street .....

Town and State .....

4/28/62



20 Channels "X" Carrier With Self Contained Oscillators

The Basic "X" Carrier System Has Been Expanded

With requests from our customers for additional system applications we have, over the past three years, developed and placed in service the following equipment based on the "X" design

"X" TRUNK CABLE CARRIER

Provided in 20 channel blocks in the frequency range of 16KC to 336KC with many signalling options

"XU" SUBSCRIBER CABLE CARRIER

Providing FX, frequency ringing, or superimposed ringing on buried or aerial cable plant

"XM" MULTIPLEX AVAILABLE IN

20 channel groups for systems with a maximum of 20 channels or 10 channels groups for systems requiring up to 80 channels.

"XL" TRUNK OR SUBSCRIBER

carrier for use on open wire/cable systems with long entrance cables which may require carrier frequency repeatering.

PANHANDLE ELECTRIC SALES, INC.

P. O. Box 248, Arlington, Texas

This Equipment Marketed by

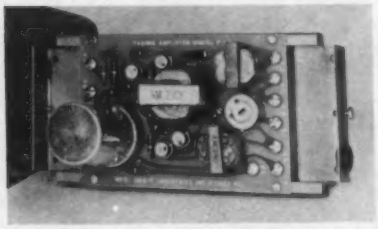
INTERNATIONAL TELETRONICS, INC.

644 Braniff Airways Building
Dallas 35, Texas

NEW
REVENUE PRODUCING PRODUCT

TELEPHONE PAGING AMPLIFIER

- *MEDIUM POWER PAGING AMPLIFIER—INDOOR & OUTDOOR*
- *APPLICATIONS UNLIMITED—BUSINESSES, RESIDENCES, ETC.*
- *HANDLES UP TO FOUR REMOTE SPEAKERS*
- *PROVIDES TALKING BATTERY FOR PHONE-TO-PHONE INTERCOM*
- *FULLY TRANSISTORIZED—ECONOMICAL*



MODEL P-5 PAGING AMPLIFIER

The Model P-5 Paging Amplifier provides one-way voice paging, originating at a two-line telephone instrument or key-set instrument. Model P-5 also provides talking battery for phone-to-phone intercom in case of two-line and/or key set installations.

SPECIFICATIONS:

POWER: 110-120 V.A.C.
POWER CONSUMPTION: 3 watts
AMPLIFIER SIZE: 3½" x 7½" x 3"
REMOTE SPEAKERS: Indoor and outdoor available

For use with various indoor and outdoor speakers. Complete literature on Paging Amplifier and Speakers upon request.

Ordering Information

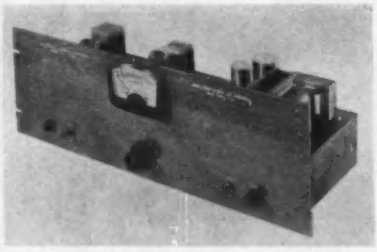
P-5 PAGING AMPLIFIER $50.00
F.O.B. Vienna

ORBIT

ORBIT INDUSTRIES, INC.
VIENNA, VIRGINIA
703-938-2660

conditions of the input stage are said to have been carefully determined to provide optimum limiter action with minimum distortion.

The input may be connected directly



either to a balanced 600 ohm line (with either or neither side grounded) or it may be bridged across a 600 ohm line without upsetting line impedance. Rapid automatic gain reduction is said to prevent syllable clipping.

Its frequency response is rated at ±1 db and 20 to 200,000 cps. Request NP1877.

•

COLOR-CODED TAPES — Bishop Manufacturing Corp. has introduced a color-coding system for two of its electrical tapes most widely used by telephone companies and electrical contractors.

According to Harmon Gillman, vice president for research and development, the new color coding applies exclusively to the company's Bi-Seal (polyethylene-based) and No. 30 (buytl-based) tapes, differentiating between their specialized uses in each case.

The company believes this development is an industry "first," and says it should speed up and simplify the correct selection of tape for both emergency and routine field operations.

Bi-Seal, coded red, is specifically designed for use with polyethylene insulated wire and cable. No. 30 High Voltage Splicing Tape, coded green, is designed for cables insulated with ozone-resistant compounds and rated in excess of 2000 volts. Request NP-1878.

•

MINIATURIZED INSTRUMENT— Versatility of the pocket-sized, precision transistorized "Stethotracer" has been widened through seven miniature attachments to detect and demodulate frequency signals from audio up to 10 KMC, and amplify signal 1000 times for earphone, oscilloscope, or recorder, acoustical measurement, audio and mechanical vibration pick-up, according to the manufacturer, Don Bosco Electronics, Inc., a subsidiary of Howell Electric Motors Co.

The seven new attachments are:

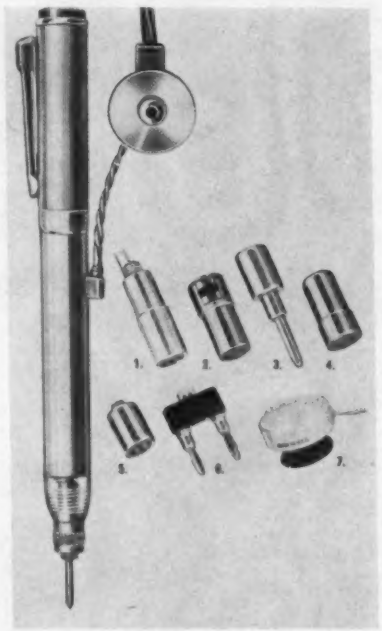
(1) Microwave demodulator for detecting and demodulating modulated frequency signals from 300 MC up to 10 KMC.

(2) Magnetic tape head for monaural monitoring of information on magnetic sheet or tape in motion provided by any type of magnetic recording device.

(3) Vibration pick-up for detecting mechanical vibrations such as a watch escapement, roller bearings, bushings in operation, gas or liquid flow through pipelines, rotation of shafts in bearings, etc. Its range is 200 cycles through ultrasonic frequencies that can be observed on an oscilloscope with the use of an output adapter plug.

(4) Microphone covering the speech range, for use in accoustical detection. It can also be used with the Stethotracer as a hearing aid.

(5) Input adapter that can be connected to the output of devices with



standard miniature phono pin plugs.

(6) Output adapter to connect the Stethotracer to an oscilloscope or recording instrument for accurate output measurement. It provides 600 ohms impedance with a DC level of 0.80 volts (using an AC input on the scope). Stethotracer with output adapter can be used as a high gain (1000) preamplifier.

(7) Telephone pick-up that attaches to the receiver end of a telephone with a suction cup that can be used for an additional listener, such as a stenographer. This accessory is used with the input adapter. Request NP1879.

•

PRESSURE SENSITIVE SIGNS— Multi-Color Process Co. offers a series

IN THE FIELD . . . AWAY FROM REGULAR POWER

terado

Battery Converters

PROVIDE

110 VOLT, 60 CYCLE A.C. POWER FROM YOUR TRUCK BATTERY

TO OPERATE

- LIGHTS
- ELECTRIC SOLDERING IRONS
- ELECTRIC DRILLS
- OTHER ELECTRIC TOOLS

FOR

- NEW WIRING JOBS
- SERVICING AND MAINTENANCE
- OPERATION OF TEST EQUIPMENT

"TRANSISTORIZED" THE CONTINENTAL 275 to 300 watts MODEL 50-193 USERS NET $116.34

THE SUPREME 175 to 250 watts MODEL 50-153 USERS NET $73.34

Both models have remote control

mfd. by terado COMPANY

1072 RAYMOND AVENUE, ST. PAUL 8, MINNESOTA

Install telephone cable under pavement the QUICK, LOW COST way with a

TROJAN

PIPE PULLER and PUSHER

Don't dig! Don't break the pavement! Install telephone cable the practical, economical way with a Trojan.

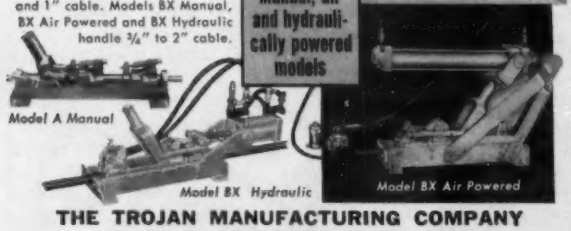
The Trojan combines pushing and pulling in one compact machine—can be switched easily from one operation to the other in 30 seconds. Heavy steel push pipe comes in convenient 30" lengths, assures straight travel. A 40' push can often be made in 20 min.

The largest models require only a 6' long trench—and all are designed for easy operation. The model BX Hydraulic can be powered directly from the telephone service truck or backhoe.

Write today for full details.

Model A Manual handles ¾" and 1" cable. Models BX Manual, BX Air Powered and BX Hydraulic handle ¾" to 2" cable.

Manual, air and hydraulically powered models



THE TROJAN MANUFACTURING COMPANY
1124 RACE DRIVE, TROY, OHIO

KILL NOISE

. . . enjoy telephoning in the noisiest places with a

BURGESS-MANNING ACOUSTI-BOOTH

The name "Acousti-Booth" tells you the difference! It is more than a new *enclosure* design . . . it provides a sound-absorbing performance that eliminates extraneous, disturbing noises to give you a new comfort, convenience and privacy when phoning in the noisiest places. You'll find them wherever noise is a problem . . . in stores, terminals, lobbies, offices, factories.

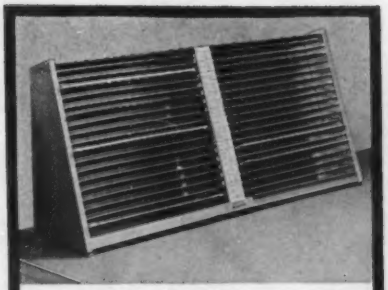
The Model 45 (illustrated) is one of a full line of wall-mount, or floor models to choose from.

Write for the Acousti-Booth Catalog

BURGESS-MANNING COMPANY

P.O. BOX 350—W LIBERTYVILLE, ILL.

ARCHITECTURAL PRODUCTS DIVISION



Trouble Recorder Card Rack

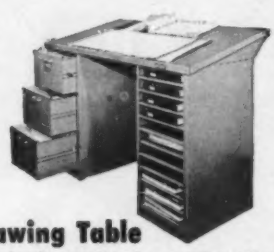
For fast orderly sorting of Trouble Recorder cards, has 38 card slots in two banks with index strip between. Base is 38" by 8". Height 15". No. D-30325-1.

Telephone Office Equipment

to lighten your work and improve efficiency

Work Bench

For repair, assembly, test and paper work. Top drawer divided into 24 compartments for parts and tools. Large file drawers are for circuit drawings. 54" x 25" top covered with masonite. Height 36". Drawers may be inserted from back to reverse position of kneehole. No. D29978-3.



Drawing Table

For circuit drawing in crossbar offices, provides central location for reference material. Masonite top is 30" x 60". Height 36" at front, 42" at rear. Three large file drawers at left for drawings. Eleven shelves at right are 2½" high, 14" wide, 18" deep for sketches, sequence charts, book type SD sheets, trunk serials, etc. No. D30326-1.

Color of all units: Baked-on gray enamel unless otherwise specified.

TWIN POST

Neubauer

MANUFACTURING CO.

517 LOWRY AVENUE N.E.

MINNEAPOLIS 18, MINN.

of pressure sensitive, die-cut dial signs for direct dial service in hotels, motels, and various inplant phone

operations. The firm also makes a wide variety of buried cable warning signs in pressure sensitive plastic material and metals, all weatherproofed for outdoor use. Request NP1880.

•

VERSATILE LADDER—Norseman, Inc., has a 3-in-1 ladder which is said to have practically unlimited versatility to meet all exacting requirements.

The company says it combines portability with convertibility and replaces several commonly used items such as stepladder, scaffold, wall ladder, etc. It is constructed of durable magnesium with steel fittings. It can be lengthened by adding 2-foot extensions, which snap on with self-locking steel pins.

It is said to be compact and easy to transport and store. The 12-foot, six-section ladder can fit in the truck of the average automobile, and weights 37 pounds.

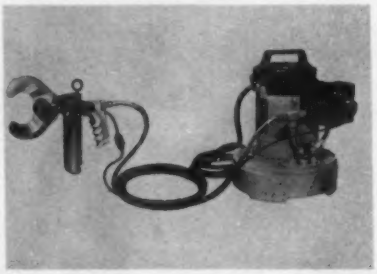
Two-foot add-on sections, complete with fittings, weigh 6 pounds. Request NP1881.

•

CABLE CUTTER—H. K. Porter, Inc. announces a Power-Operated Hydraulic Cable Cutter which is said to make cuts with a minimum of crushing either of the cable or the inside wires and can be repeated with only fingertip pressure on a push-button control.

The unit combines the HKP Cutter Heads with hydraulic power units which operate from any 110-volt, 60-cycle, single-phase outlet.

According to the company, safety experts helped design it for worker safety. One hand of the operator is required on the adjustable guide handle, and the other on the pistol grip. The tool is operated by a push button built into the pistol grip.



The jaws of the cutter head give shear action which is said to minimize crushing of cable and distortion of inside wires. An adjustment can be made to compensate for wear on blade cutting edges.

One model cuts copper and aluminum cable (not ACSR) through 3 inches in diameter. Another cuts soft or medium-hard metals, including reinforcing rod, etc., through 3/4 inch diameter, and there is another for cutting soft and medium hard coarse stranded guy wire, wire rope and cable through 3/4 inch diameter. Request NP1882.

•

RIGID-TUBE TOWERS—The Rohn Manufacturing Co. has added five lines of "Rigid Tube" towers to its products, according to Dwight Rohn, president. "Rigid Tube" towers are triangular-designed, with all-bolted construction and manufactured from steel tubing of variable sizes.

This new tower permits installations of antenna up to 600 feet and, according to the company, can supply the

CUSTOM ENGINEERED GCP INC. COMMUNICATORS

Successor to Western Electric Company in the manufacture of railroad train dispatch and associated equipment.

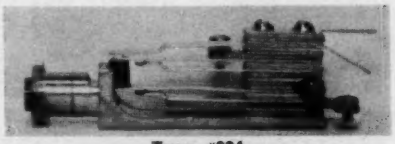
JACKS

Where signalling begins, nothing less than the best will do. Why use a light weight jack when reliability is essential?

G.C.P. provides a variety of jacks to meet the most exacting heavy duty conditions. These are ruggedly built to rigid Western Electric Standards, to withstand line surges in excess of 2500 volts A.C. and 3500 volts D.C.

TYPES AVAILABLE FROM STOCK

#200	#223-A
202	#224
203	#237-C
208	



Type #224

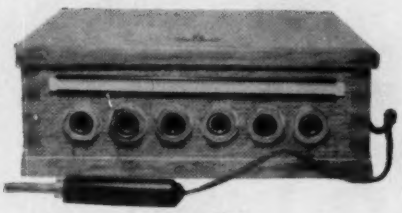
JACK BOXES

Each jack needs a mounting in order to facilitate communication.

G.C.P. offers several types in attractive oak wood with nickel fittings.

TYPES AVAILABLE FROM STOCK

#345-A
385-A-B-C-D
386-A-C-D-F
389-A



Type #386

These JACKS and JACK BOXES can be ordered individually, in sets, or from parts list in catalog. Prices are attractive and will be quoted upon request. Delivery from factory stock.

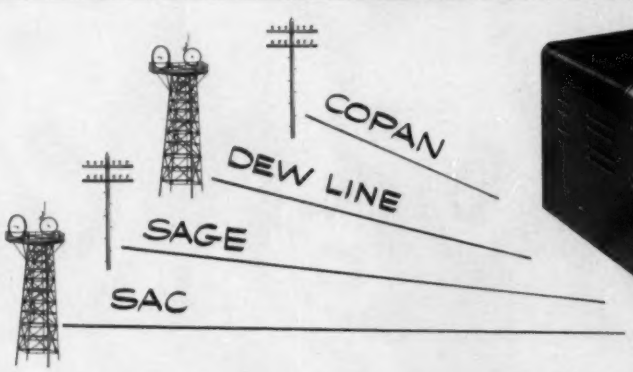
GENERAL COMMUNICATIONS PRODUCTS, INC.

GCP INC.

Box 53, Trevose, Pennsylvania

Telephones:
Elmwood 5-1333 and 1334
or 215-355-1333 and 1334

Distributed by GraybaR ELECTRIC COMPANY



The Scribe Internationale SI-80 is designed and engineered to supply the specific requirements of remote recording and transcribing on magnetic tape. This provides the user with a complete, compact telephone recorder-transcriber designed for this specific type application. There is no "extra" equipment required to do the job. Its features include magazine loading of the magnetic tape, remote control operation, fast forward and rewind speeds, printed circuit amplifier, excellent clarity with a built-in speaker and simplicity of operation and service.

TELEPHONE RECORDER-TRANSCRIBER

Scribe SI 80

Scribe Internationale
Division of General Sintering Corporation

1830 No. 32nd Avenue
Melrose Park, Illinois
Telephone MA 6-6846

No more stopping to clear chips

New Irwin Pole-Bor Bits save time . . . money

Now get easier, faster, non-stop boring action in telephone and power poles. Irwin Pole-Bor bits give continuous chip flow—even in creosoted wood. Special Irwin cutting head, twist angle, and smooth-polished hollows eliminate clogging and binding. Side lip smooths hole for easier insertion of bolts and pins. Heat tempering full length gives extra strength, more safety for the man on the pole.

3 Lengths — 12 Sizes

New Irwin Pole-Bor bits come in 12″, 18″ and 24″ lengths, with 8″, 12″ and 18″ twists. Sizes range from $^{9}/_{16}$″ to $^{17}/_{16}$″. Use these new Irwin bits for just about any job — whether boring crossarms, small, medium or extra large poles, heavy timbers. And remember: Irwin's patented Adapter Shank fits both hand braces and electric drills. Save time and money. Use fewer bits on the job. Get Irwin Pole-Bor non-stop boring action and extra safety, too. Order from your Irwin distributor today. The Irwin Auger Bit Company, Wilmington, Ohio.

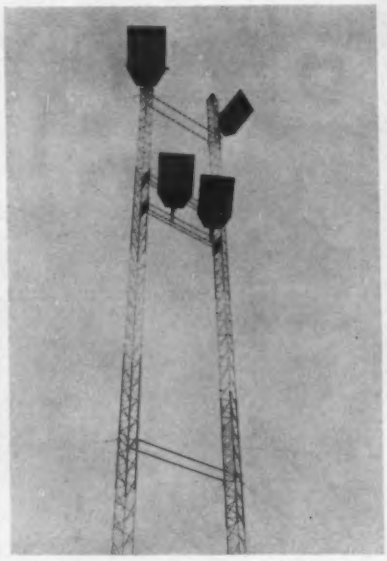
Irwin Adapter Shank fits both hand braces and electric drills

Comes like this with taper square shank for use in hand braces.

Cut off taper square shank. Use in both hand braces and electric drills. No wobble, no run-out.

IRWIN Pole-Bor Bits

needs for most microwave and other communication requirements. They



are available either assembled or knocked down for easy transportation. Request NP1883.

•

SMALLEST DITCHER—The Vermeer Manufacturing Co. announces Model W-1, the latest addition to its line of Pow-R Ditchers. The new unit digs up to 60 inches deep and is the smallest ditcher in the line. It can be

used by telephone companies, contractors, custom operators, nursery operators, plumbers, and electrical contractors.

The Model W-1 features all-hydraulic drive, in both digging and transporting speeds. Available on either crawler tracks or rubber tires, the unit is powered by a 12½ hp engine.

Special ejector paddles are said to allow dirt to be deposited on both sides of the ditch rather than thrown over a wide area, enabling faster and easier backfilling and cleaning of the area.

The W-1 end boom idler is equipped with a Timken bearing. The boom is raised and lowered hydraulically. Request NP1884.

Mr. and Mrs. J. Max Osborn of Onamia, Minn. were honored on Apr. 4 upon his retirement as owner and manager of Mille Lacs Telephone Co. which Mr. Osborn served for 37 years. About 350 friends and well-wishers gathered at the Onamia High School for the home town version of the Osborns' "This Is Your Life" program over which Mayor Orville Herrington presided as master of ceremonies. Among those present were Mr. and Mrs. Del Ludina, the new owners of the Mille Lacs company.

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L. M. Berry Co. Holds Management Conference

L. M. Berry and Co. held a three-day management conference in Dayton, O., March 29 through 31, attended by general office executives and management men from the company's four territories.

J. W. BERRY

Areas of discussion included management development, telephone sales, personnel, training, and the company's new services committee, a clearing house for ideas and recommendations for improving and expanding services to users, advertisers, and telephone company customers.

J. W. CRAIG JR.

John W. Berry, managing director, and J. William Craig Jr., general sales manager, directed the conference. Attending were W. R. Calhoon, company auditor; J. P. Fraim, executive assistant; R. H. Eshelman, general sales supervisor; W. L. Wolcott, personnel and training director; E. F. Tinnerman, Wisconsin territory manager; H. F. Scott, territorial manager; W. J. McGirl, southern territory manager; F. L. Hawker, eastern territory manager; J. M. Bayley, eastern sales manager; J. P. White, southern area manager; and J. C. Rudwall.

Lindsay Supply Co. to Handle Nelson Fastening Devices

Lindsay Telephone Supply Co. has been appointed a distributor of Nelson fastening devices by Gregory Industries, Inc., manufacturer of stud-driving equipment and expansion anchors for the construction industry and industrial maintenance field. The Lindsay company's territory includes all of the U.S. east of the Mississippi River and the states of California and Washington.

The Nelson line includes a new hammer drive tool, designed for light fastening to concrete, masonry or light gauge metal; Nelson powder-actuated, stud driver tools and drivestuds, and Bulldog expansion anchors and toggle bolts.

NEW!

POW-R-SPADE®

SELF-PROPELLED TRENCHER

MODEL 7200

Rugged, trouble-free POW-R-SPADE digs down to 6 ft.!

Yes, this larger self-propelled POW-R-SPADE is new . . . to you. But to the engineers and development people at Stampings Inc. it is several years old. During that time this new machine has been severely tested and proved. Now we can offer a larger size POW-R-SPADE confident that it will stand up under toughest digging conditions. Every part is designed and constructed with an extra margin of ruggedness and strength to eliminate breakdown possibilities. Model 7200 digs to 6 ft. deep in widths of 4 and 6 inches; 8 and 12 inch widths to proportional lesser depths.

Built-in towing bar for moving to the job behind car or truck. No trailer is necessary. Four digging speeds up to 15 ft. per minute depending on soil

◀ AMERICA'S MOST POPULAR LIGHTWEIGHT TRENCHER

This is the machine that has won the loyalty and respect of users all around the country since its introduction in 1956. Today there are more in use than any other in its class. Recommended for trenching to lay cable, conduit, pipe, tubing where 3" width by 24" depth is sufficient. In the words of satisfied users . . . "a labor saver, easy to operate, and profitable."

Model 1902. Digs 3" wide to 24" deep or 4" wide to 18" deep. Light weight, compact, portable. Digs 1½ to 17 ft. per minute depending on soil conditions. Digs straight, curves, or angles. One man operation from start to finish. Shipped completely assembled.

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AE Sales Announces Five New Staff Appointments

Automatic Electric Sales, Northlake, Ill., has announced five new appointments to staff positions. Paul P. Barnes, former sales promotion director of Leich Sales, Chicago, is now director of customer financing; Lawrence J. Rizzo, formerly general commercial manager of Leich Sales, takes the position of director of supplier relations; Leroy E. Savage, previously director of supply sales, becomes staff transmission engineer; Hugh W. Skidmore, eastern district manager of Leich Sales, assumes the duties of supply sales manager; and Jack A. Webber, formerly director of P-A-X and P-A-B-X sales, becomes director of business communications. These assignments became effective Apr. 1 in conjunction with the merger of Leich Sales into AE Sales.

P. P. BARNES

L. J. RIZZO

Barnes, who went to AE from Leich, began his career as an engineer in 1941. He became a staff sales engineer in 1948, switchboard sales manager in 1953, and sales promotion director in 1959. The duties of his newly-created post will involve assistance to Independent telephone operating companies in obtaining long-term financial arrangements to purchase telephone equipment from AE.

L. E. SAVAGE

Rizzo went to AE in 1926 as assistant to the merchandise manager. In 1938, he switched to Leich Sales, where he climbed from warehouse manager, office manager, order editor, and purchasing agent, to general commercial manager. In his newly-created position, Rizzo will be concerned with negotiating contracts with suppliers of materials for resale to the Independent telephone industry. He also will work with G.T.&E. headquarters on setting standards for supply products, and with other manufacturing subsidiaries to coordinate supply purchases.

H. W. SKIDMORE

Savage began his career with AE in

(Continued on page 106)

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puts more years of service, reduces maintenance costs, in your plant . . .

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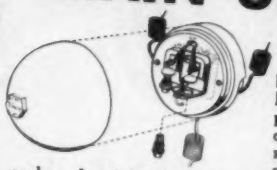

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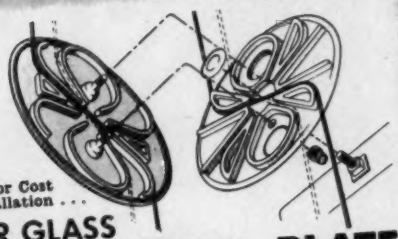

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BUPIC's better construction is responsible for these advantages. A rugged, steel-strip shield is sandwiched between two tough jackets of thick polyethylene. This feature not only provides tremendous tensile strength for the plowing operation, it also resists physical damage and rodent damage after installation.

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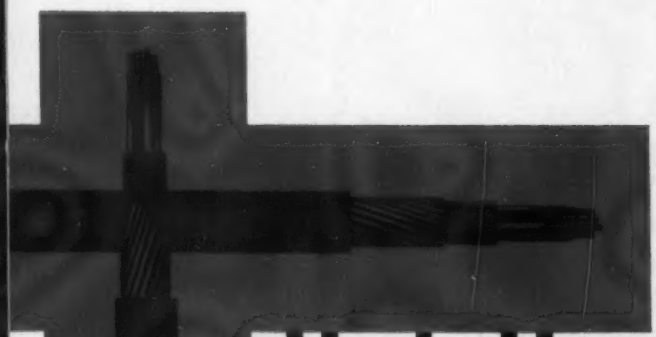
Next time you plan a direct burial installation, get Alphaduct's famed quality and AE's famed service. Order BUPIC from AE. For further information, write: Automatic Electric Sales Corporation, Northlake, Illinois. Or call: 345-7111.



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1946. He has held the positions of assistant manager of carrier and radio sales, government contract service manager, district manager, and director of supply sales. In his newly-created position, Savage will serve as

J. A. WEBBER

consultant to AE staff engineers and to Independent telephone operating company customers on transmission problems.

Skidmore started work for AE in 1947 as a chemical engineer, then became a buyer. In 1953, he went to Leich Sales as an assistant district manager. He later became district manager and has returned to AE as supply sales manager, replacing Savage. In this position, he will assist field salesmen with supplies marketing.

Webber has been with AE since 1952 as assistant manager, and then manager of P-A-X and P-A-B-X sales. In his new post, he will provide assistance to Independent telephone companies in marketing communications equipment to their business subscribers.

Automatic Electric and Leich are subsidiaries of General Telephone & Electronics Corp.

Trans-Continental Telephone Hires Novak, Barnett

Joe Novak and B. W. Barnett have been employed by Trans-Continental Telephone & Electronics, Inc., according to T. L. Anderson, president.

Mr. Novak, chief engineer, previously was with Automatic Electric Sales Corp. as sales engineer. Before that he was manager of the Bremen Telephone Corp. in Indiana for five years, spent four years in Venezuela

JOE NOVAK

supervising the Creole Petroleum Corp's telephone operations, served with Automatic Electric Co.'s installation department and owned two small telephone companies.

Mr. Barnett, controller of Trans-Continental and all affiliated companies, is a native of West Virginia and a veteran of World War II.

He was graduated from Texas Wesleyan College and has done post graduate work at Southern Metho-

B. W. BARNETT

dist University. He has been connected with Texas Telephone and Telegraph Co. as general auditor and assistant treasurer. He also was formerly treasurer of the Independent Telephone Directory Co. He is the author of several articles relating to telephone accounting.

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Ruling Principles of Utility Regulation

RATE OF RETURN

by Ellsworth Nichols

1955 Edition

One of the most important subjects, if not the ***most important subject***, constantly confronting utility managements, regulatory commissions and others concerned, is the ***amount of return*** to be ***allowed public utility companies*** and ***how best*** to ***determine that return.*** This book is *the* result of almost four years of research, study, and analysis, by Ellsworth Nichols, Editor of PUBLIC UTILITIES REPORTS and author of other publications on regulation.

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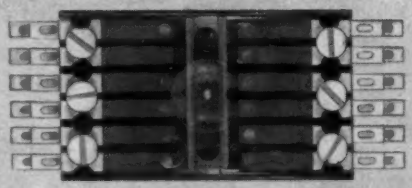
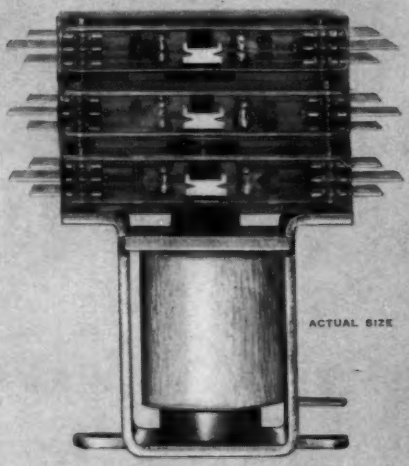


This dust-tight, see-thru wafer has 12 circuits.



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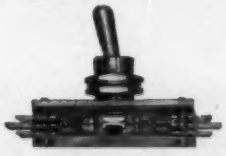
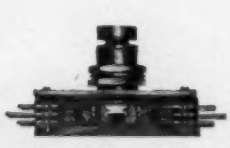
T-Bar is a small package D.C. relay designed for big circuit control jobs. 4 to 36 circuits can be actuated simultaneously. Each removable wafer contains up to 12 circuits and is used in single, double or triple layers. Only 3½ W. control 36 circuits. Proportionately less with fewer circuits. Reliability and long life were built into T-Bar when mechanical parts were built out. Installation is simple . . . drill two holes. T-Bar is used in: Network Selection, Telephone System Switches, Matrix Decoding, Control System Time Sharing, Punch Tape Reading, Computer Storage, etc. Write for bulletin TB-112.



T-Bar Switch. Bat Handle, off-on toggle type. Mounts up to 3 wafers.



T-Bar Switch. Push Button, Momentary contact type. Mounts up to 3 wafers.

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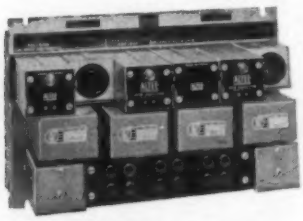
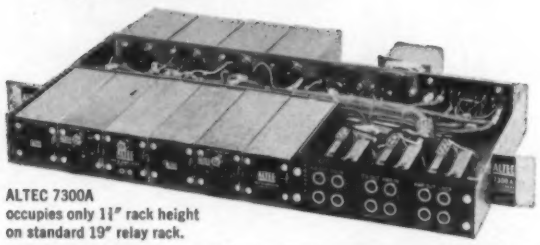
Altec Telephone Repeater Terminating Units come wired for rapid assembly of three repeater systems!



NEW! ALTEC 7303A installs on key telephone unit mountings in wall cabinets, etc. 7" H, 10½" W, 6" D. Circuitry identical to 7300A.



ALTEC 7300A occupies only 1¾" rack height on standard 19" relay rack.

Altec TRT units provide rapid means of establishing repeatered VF telephone channels for general telephone, telegraph, teletype circuits, and PBX installations. Come fully wired to receive a selection from 19 plug-in Altec circuit components that may be easily assembled for one of three telephone repeater systems: two-wire to four-wire termination, four-wire intermediate, two-wire to two-wire.

An insulated jack strip with 12 jacks permits routine system testing. Transistor amplifiers within the units are energized by local battery or either 24-26 or 48-52 volt special power supply. 130 volt supply is not required.

Altec Telephone Repeater Terminating Units and the associated line of plug-in repeater amplifiers, equalizers, networks, transformers, relays and pads are available for speedy delivery. Write for technical details and schematics, Dept. T4.

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Walker Gets New Job At Universal Controls Corp.

M. C. Walker has been appointed executive assistant at Universal Controls Corp., with sales and administrative functions.

He was associated with the International division of Collins Radio Co. as assistant director, commercial sales. Before that, he acted as manager, distributor sales, Minneapolis

M. C. WALKER

Honeywell Regulator Co., semi-conductor products division.

Other experience includes duties as area service manager, Motorola Communications and Electronics, Inc. Mr. Walker is a graduate of the University of Oklahoma, where he received an electrical engineering degree.

USI Names Two To Regional Posts

The United States Instrument Corp. Charlottesville, Va., has announced the recent appointment of Thomas F. Hughes and Robert E. Poole Jr. to its regional sales personnel.

Mr. Hughes, a native of Oak Park, Ill., was appointed regional sales engineer for USI's central region located in Chicago. He has attended Bell System schools and was employed with the Chicago offices of A.T.&T. from 1948-56. He then served as engineering manager with the Chicago-based ITT-Kellogg from 1956 to 1962.

Mr. Poole, appointed sales representative, southern region with headquarters in Atlanta, Ga., is a native of Crewe, Va. From 1939 to 1945 he served as a pilot with the 8th Air Force and his experience in the telephone business includes employment with both the Chesapeake & Potomac Telephone Co. of Virginia and as a sales representative in the Atlanta Branch of Stromberg-Carlson.

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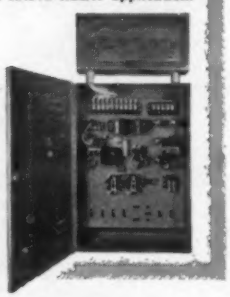

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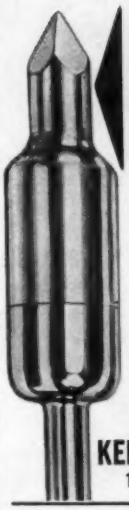

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Index to ADVERTISERS

	Page
Acme Visible Records, Inc.	48
Acoustics Development Co.	52
ADC Products	—
Alphaduct Wire & Cable Co., The	35
Altec Lansing Corp.	108
Aluminum Company of America	6-7
Aluminum Ladder Co.	66
American Appraisal Co.	110
American Creosoting Corp.	—
American Steel & Wire Co.	—
American Telephone & Telegraph Co.	—
Anaconda Wire & Cable Co.	—
Arps Corporation	—
Arrow Fastener Company	103
Auburn Machine Works, Inc.	—
Automatic Electric Sales Corp.	10-11, 58-59, 104-105
Barber Advertising Specialties, Walt.	—
Barnard & Associates, Inc., J. C.	110
Bell Telephone Laboratories, Inc.	55
Benner-Nawman, Inc.	108
Berry & Co., L. M.	—
Bethlehem Steel Co.	—
Bishop Mfg. Co.	89
Bohnsack Equipment Co.	—
Brady Co., W. H.	—
Brand, Wm.—Rex Div.	71
Buckeye Telephone & Supply Co.	78, 112
Budelman Electronics Corp.	—
Burgess Manning Co.	97
B. Y. Dial Service	113
C&D Batteries, Inc.	79
Cabaniss-Pogue Co.	110
Cable Construction Co.	110
Cable Spinning Equipment Co.	106
Calculagraph Company	—
C&S Products Inc.	—
Chance Co., A. B.	77
Chevrolet Div. of General Motors	—
Chicopee Mills Inc.	60
Cleveland Inst. of Electronics	25
Coates Field Service, Inc.	68
Collins Radio Co.	47
Colorado Fuel & Iron Co., The	62
Commercial Cord Company, Inc.	39
Communication Equipment & Engineering Co.	90-91
Cook Electric Company	13
Copperweld Steel Co.	40-41
Corcoran Construction Co.	110
Crane Inc. Carl C.	110
Davis Construction Co.	110
Davis Mfg. Co., Inc.	65
Deere & Co.	—
Dial Haven, Inc.	—
Dierks Forests, Inc.	111
Dillon & Co., Inc., W. C.	—
Donnelley & Sons Co., R. R.	—
Duo-Safety Ladder Corp.	—
DuPont de Nemours & Co., E. I.	—
E. & C. Contracting Corp.	110
Electronic Controls Inc.	107
Everstick Anchor Co.	—
Exide Industrial Div.	—
Federal Electric Co.	92
Floor-Con	—
Ford Motor Co., The	2-3
Gagne Enterprises, Inc.	—
Gans Surplus Tire Co.	113
General Cable Corporation	8-9
General Communications Products Inc.	99, 111
General Electric Company	33
General Machine Products Co., Inc.	115
General Telephone Directory Co.	16
General Welding, Inc.	107
Gladwin Plastics, Inc.	81
Gould-National Batteries, Inc.	—
Graybar Electric Co.	—
Greenlee Tool Co.	—
Hallamore Electronics Co.	—
Harris-McBurney Company	110
Henkels & McCoy	110
Highway Trailer Industries	—
Hirsch Organization, Inc., Gustav	—
Hitachi, Ltd.	14
Hogg & Davis, Inc.	54
Holan Corp.	51
Homs Company, Douglas	76
Hughey & Phillips, Inc.	110
Indiana Steel & Wire Co.	—
International Teletronics Inc.	83
Irwin-Auger Bit Co.	100
ITT-Kellogg	72-73
Johns-Manville Corp.	—
Justrite Mfg. Co.	102
Kearney Co., Jas. R.	—
Kelley Products	—
Kemode Manufacturing Co., Inc.	111
Keystone Steel & Wire Co.	—
Killoren Company	110
Klein & Sons, Mathias	—
Knapp Mfg. Co.	—
Koppers Co., Inc. Wood Preserving Div.	111
Kwal Paints, Inc.	93
Lenkurt Electric Co.	—
Lindsay Telephone Supply Co.	29
Lobred & Co., Jas.	110
Lorain Products Corp., The	—
Lynch Communication Systems, Inc.	67
Magnolia Chemical Co., Inc.	37
Mast Directory Co., Leland	111
McCabe-Powers Body Company	61
McGrath Engineering Inc.	—
Mead Specialties Co.	—
Monarch Molding, Inc.	—
Morrison-Pelsue Co.	—
Natco Corporation	—
National-Standard Co.	—
National Telephone Supply Co.	Back Cover
Neubauer Manufacturing Co.	98
Neuses, Inc., P. K.	111
North American Philips Co.	87
North Electric Company	84-85
Northeast Electronics Corp.	—
Olin Mathieson Chemical Co.	—
Onan Division, Studebaker-Packard Corp.	30-31
Orangeburg Mfg. Co.	—
Orbit Industries, Inc.	96
Page & Hill, Inc.	111
Panhandle Electric Sales, Inc.	95
Parsons Company	64
Petersen Engineering, Inc.	—
Phelps Dodge Copper Products Corp.	—
Platt Electronics Corp.	63
Precision Multiple Controls, Inc.	—
Preformed Line Products Co.	56-57
Pruzan Company, Jack	111
Puregas Equipment Corp.	75
R-P Corporation	53
Radio Corporation of America	—
Radiation Inc.	94
Railway Communications, Inc.	—
Rawlplug Co. Inc., The	—
Raytheon Co., Inc., The	—
Recordak Corp.	—
Reilly Co., B. G.	113
Relay Sales	68
Reliable Electric Company	43
Republic Creosoting Company	88
Rezolin Inc.	86
Rockwell Products Corp.	—
Rohn Manufacturing Co.	91
Rolatape, Inc.	—
S & G Manufacturing Corp.	80
Schauer Mfg. Co.	80
Scribe International	99
Seymour Smith & Son	—
Sherron Metallic Corp.	—
Sierra Electronics Corp.	—
Sloan, Cook & Lowe	110
Stahl Metal Products	109
Stampings, Inc.	101
Steel City Elec. Co.	70
Stewart Brothers	—
Stromberg-Carlson® Products, General Dynamics/ Telecommunications	4-5
Studebaker-Packard Corp.	49
Superior Cable Corporation	—
Suttle Equipment Corporation	69
T.E.I. Corp.	—
Telectric Co.	113
Tele-Muff Co.	—
Telephone Cables, Ltd.	—
Telephone Carrier Service	110
Tel-Plastics, A Div. of Woodman Co., Inc.	82
Tele-Service Co.	111
Teletype Corporation	—
Tele-Wire Supply Co., Inc.	111
Telkor, Inc.	113
Terado, Company	97
Thornhill Publishing Co.	100
Transandean Associates, Inc.	—
Trans-Technion, Inc.	103
Trepac Corp. of America	—
Trojan Manufacturing Co.	97
Tudor & Yager, Inc.	110
Union Carbide Plastics Company	15
U. S. Cable Constructors, Inc.	—
United States Independent Telephone Association	—
United States Instrument Corp.	—
United States Motors Corp.	—
United States Steel Corp. American Steel & Wire Co.	—
Utilities Contracting Corp.	—
Utility Equipment Co.	—
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Weikel Line Company	111
Welding Service	76
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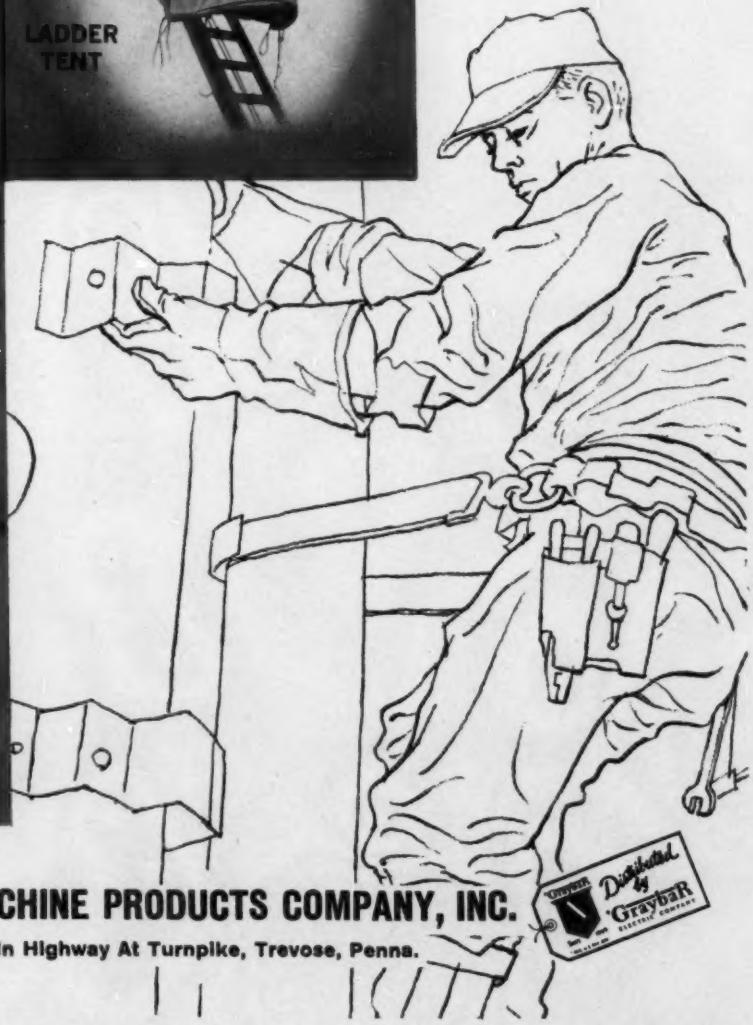

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